

Mohamad Zaman Kassaee, PhD

Professor of Organic Chemistry

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My growth mindset is deeply rooted in my interdisciplinary academic background, which spans a B.S. in Biology, a B.S. in Premedical Sciences, an M.S. in Photochemistry, a Ph.D. in Organic Chemistry, and postdoctoral research in Cancer Chemistry. This diverse foundation has shaped my career as both an educator and researcher.

In academia, I have had the privilege of teaching 20 diverse courses across B.S., M.S., and Ph.D. programs, while mentoring 51 M.S. theses, 33 Ph.D. dissertations, and one postdoctoral researcher. My collaborative research efforts have resulted in 245 publications in over 70 high-impact scientific journals, more than 300 invited international seminars, 10 registered patents, 3 translated articles, and the authorship of one book.

On the experimental side, my work has focused on the design, synthesis, and characterization of highly pure, recoverable, and cost-effective green compounds, including both magnetic and non-magnetic, nano- and non-nano-scale materials, with consistently high yields. These compounds have demonstrated broad applications across industry, medicine, agriculture, and dentistry.

In theoretical research, I have explored experimentally inaccessible transition states and short-lived reactive intermediates, such as carbenes, silylenes, germylenes, stanylenes, and plumbylenes, providing novel mechanistic insights into complex chemical processes.

Additionally, I have had the honor of serving as a referee for numerous international journals, contributing to the advancement of knowledge across multiple scientific disciplines.

Excutive Activities

- 1- Vice President of Abadan Institute of Technology (AIT).
09/01/1989-23/09/1990
- 2- Founder of the University of Petroleum Industry (UPI). This was achived through upgrating the academic level of AIT and turning it into a respectful university (UPI) in the midst of a big war.
14/08/1989 - 23/09/1990
- 3- Vice President of UPI. 23/09/1990 – 23/09/1991
- 4- Head of the Chemistry Departmental at AIT and UPI.
23/09/1990-23-09-1991
- 5- Distinguishe professor at AIT and UPI. 03/07/1988 – 23/09/1990
- 6- Distinguishe professor and top researcher at Tarbiat Modares University (TMU).
- 7- Head of the Chemistry Department at TMU.
- 8- Sabbatical at Vanderbilt University (VU), Nashville, Tennessee.

Academics

Postdoctoral in Cancer Research

"Synthesis of radioactive labeled unusual mutagenic polyenes, found in colon cancer patients, and their binding to DNA"

Virginia Polytechnic Institute and State University, Blacksburg, VA, USA

<https://www.virginia.gov/agencies/virginia-polytechnic-institute-and-state-university>

PhD in Organic Chemistry (Reactive Intermediates)

"Generation and characterization of conjugated monocyclic C₉H₈ carbenes"

University of Montana, Missoula, MT, USA <https://10times.com/venues/university-of-montana>

MS in Organic Photochemistry

"Photochemistry of β -methyl- β -nitrostyrene and its derivatives"

Western Kentucky University, BowlingGreen, KY, USA <https://www.wku.edu>

BS in Biology and Premedical Sciences

University of Oregon, Eugene, OR, USA <https://www.uoregon.edu>

Selected Publications (245 papers)

1. Ghassem Alaskari, M.; Sepehri, A.; Kassaee, M.Z., **"Topological and Topographical Orders in Twisted Graphene: Pathways to Quantum and Electronic Innovations"**, *International Journal of Physics Research and Applications*, **2025**, 8(7), 211-221.
2. Ghassem Alaskari, M.; Sepehri, A.; Kassaee, M.Z., **"Unlocking Graphene's Potentials: Size Distribution and Topological Advances"**, *International Journal of Physics Research and Applications*, **2025**, 8(4), 052-058.
3. Safaei, S.; Cheshmehkani, A.; Kassaee, M.Z., **"A theoretical quest for laetrile drug delivery by neutral, cationic, and anionic gold nanoparticles"**, *Computational and Theoretical Chemistry*, **2025**, 1246, 115105.
4. Sodagar, M.R.; Kassaee, M.Z., **"Changes in gender ratios in university classes and their possible effects"**, *KhouzihaDaily* 977, **2025**, 4, 3.
5. Kassaee, M.Z., **" Why do we cough but birds don't? "**, *KhouzihaDaily* 1036, **2025**, 4,5.
6. Kassaee, M.Z., **"Three nights, three days, and a lifetime of health "**, *KhouzihaDaily* 1043, **2025**, 4, 4.
7. Kassaee, M.Z., **"From Kafisheh to Ahvaz "**, *KhouzihaDaily* 1048, **2025**, 4, 6.
8. Kassaee, M.Z., **"Hormuz, the red gem of the Persian Gulf "**, *KhouzihaDaily* 1055, **2025**, 4, 4.
9. Kassaee, M.Z., **"A child in Abadan, a theory in the cosmos "**, *KhouzihaDaily* 1051, **2025**, 4, 5.
10. Kassaee, M.Z., **"Poetic Atmosphere: A Bridge Between Cultures "**, *KhouzihaDaily* 1068, **2025**, 4, 8.
11. Rahmati, S.; Ayoubi-Chianeh, M.; Kassaee, M.Z., **"Activation of dihydrogen by group-14 substituted germynes"**, *Journal of Physical Organic Chemistry*, **2024**, 37(3), e4593.
12. Nasser, F.; Nasser, M.A.; Kassaee, M.Z.; Yavari, I., **"Synergistic performance of a new bimetallic complex supported on magnetic nanoparticles for Sonogashira and C–N coupling reactions"** *Scientific Reports*, **2023**, 13(1), 18153.
13. Soroudi, S.H.; Kassaee, M.Z., **"Effects of N-substitution on CO₂ trapping by cyclic vinylidenes at DFT levels"**, *Structural Chemistry*, **2023**, 34, 467–476.

14. Soroudi, SH.; Kassaee, M.Z., "Capture of CO₂ by O, S, and Se substituted triplet N-heterocyclic vinylidenes: A theoretical comparison", *Journal of Physical Organic Chemistry*, **2023**, 34(7), 74-82.
15. Ahmadi, A.A.; Ayoubi-Chianeh, M.; Kassaee, M.Z.; Bayat, F., "Inclusion complexes of atorvastatin calcium (ATV-Ca) and rosuvastatin calcium (ROV-Ca) drugs with α -CD, β -CD, γ -CD, HP- β -CD, M- β -CD, and maltodextrin along with their characterizations through experimental and computational methods" *The Canadian Journal of Chemical Engineering* **2023**, 101(7), 4200-4216.
16. Abedini, N.; Amouzgar, D.; Kassaee, M.Z.; Zamani, M., "Theoretical descriptions of novel silicon analogs of cyclo[18]carbo", *Journal of Physical Organic Chemistry*, **2023**, 36(7), e4501.
17. Mohammadian Sour, S.; Eidi, S.; Kassaee, M.Z., "Efficient Suzuki coupling over novel magnetic nanoparticle: Fe₃O₄/L-(+)-tartaric acid/Pd(0)", *Molecular Diversity*, **2023**, 27, 1469-1479.
18. Soroudi, SH.; Kassaee, M.Z., "Capture of CO₂ by novel diiodo-N,N-imidazoliumvinylidene: A theoretical quest", *Journal of Physical Organic Chemistry*, **2022**, 35 (5), e4323.
19. Soroudi, SH.; Kassaee, M.Z., "CO₂ trapping of selected N-heterocyclic vinylidenes with an NBO mechanistic scrutiny by DFT", *Journal of the Chinese Chemical Society*, **2022**, 69 (4), 646-656.
20. Abedini, N.; Kassaee, M.Z., "Estimating structure, stability, and electronic properties on halogenated derivatives of 2-germabicyclo[1.1.1.] pentane-2-ylidenes at density functional theory", *Journal of Molecular Modeling*, **2022**, 28 (8), 1-11.
21. Abedini, N.; Kassaee, M.Z., "The effects of halogen substituents on structure, stability, and electronic properties of bicyclo[1.1.1.]pentanylene at density functional theory", *Journal of Physical Organic Chemistry*, **2022**, 35 (3), e4304.
22. Abedini, N.; Kassaee, M.Z., "Estimating the Stability and Reactivity of Bicyclic Silylenes and their Halogenated Derivatives at DFT", *Silicon*, **2022**, 14, 6777-6785.
23. Abedini, N.; Kassaee, M.Z., "Theoretical descriptions of novel bicyclic stannylenes and their halogenated derivatives", *Journal of the Iranian Chemical Society*, **2022**, 19, 3837-3843.
24. Abedini, N.; Kassaee, M.Z., "Substituent Effect on Structure, Stability, and Electronic Properties of the Novel Bicyclic Silylenes at DFT", *Silicon*, **2022**, 14, 2089-2095.
25. Ahmadi, A.A.; Kassaee, M.Z.; Ayoubi-Chianeh, M.; Fattahi, A.R., "Gold at crossroads of radical generation and scavenging at density functional theory level: Nitrogen and oxygen free radicals vs. their precursors in the face of nanogold", *Journal of Physical Organic Chemistry*, **2021**, 34 (1), e4126.

26. Abedini, N.; Kassaei, M.Z., "Substitution effects on novel bicyclo[2.2.1]hepta-7-silylenes by DFT", *Journal of Molecular Modeling*, **2021**, 27, 1-13.
27. Abedini, N.; Kassaei, M.Z., "A quest for stable bicyclic carbenes with one, two, and three carbonic centers at theoretical level", *Structural Chemistry*, **2021**, 32, 1105–1112.
28. Ayoubi-Chianeh, M.; Kassaei, M.Z., "Stable four-membered cyclosilylenes at theoretical levels", *Journal of the Chinese Chemical Society*, **2021**, 68 (4), 541-550.
29. Abedini, N.; Kassaei, M.Z., "Estimating the stability and reactivity of novel bicyclic germynes at density functional theory", *Journal of Physical Organic Chemistry*, **2021**, 34 (8), e4208.
30. Nasresfahani, Z.; Kassaei, M.Z., "Bimetallic Ni/Cu mesoporous silica nanoparticles as an efficient and reusable catalyst for the Sonogashira cross-coupling reactions", *Journal of Organometallic Chemistry*, **2021**, 937, 1-6.
31. Nasresfahani, Z.; Kassaei, M.Z., "Nickel-Copper bimetallic mesoporous nanoparticles: As an efficient heterogeneous catalyst for N-alkylation of amines with alcohols", *Applied Organometallic Chemistry*, **2021**, 35 (1), e6032.
32. Rahmi, K.; Kassaei, M.Z.; Khorshidvand, N., "Comparison of bis(alkylthio)carbenes by density functional and second-order Møller–Plesset perturbation theory", *Journal of Physical Organic Chemistry*, **2021**, 34 (1), e4122.
33. Soleimani Purlak, N.; Kassaei, M.Z., "New N-heterocyclic mono- and disilavinylidene iron-complexes by density functional theory", *Journal of Physical Organic Chemistry*, **2021**, 34 (3), e4148.
34. Abedini, N.; Kassaei, M.Z.; Cummings, P.T., "Borasilylenes in Focus: Topological Effects of Nitrogen Atoms by DFT", *Silicon*, **2021**, 13, 3377-3383.
35. Eidi, E.; Kassaei, M.Z.; Nasresfahani, Z., "Efficient synthesis of symmetrical anhydrides by cross dehydrogenative coupling of aryl aldehydes over CuFe₂O₄ nanoparticles", *Chemical Monthly*, **2021**, 152, 461-468.
36. Ayoubi-Chianeh, M.; Kassaei, M. Z., "New Hydroxylated Cyclic and Acyclic Silylenes *via* DFT", *Silicon*, **2021**, 13, 1-13.
37. Mohebi, N.; Kassaei, M.Z., "New N-heterocyclic plumblylenes (NHPbs) and their complexes with palladium and platinum by DFT", *Structural Chemistry*, **2021**, 32, 731-757.
38. Mohebi, N.; Kassaei, M.Z., "New N-heterocyclic plumblylenes (NHPbs) and their complexes with palladium and platinum by DFT", *Structural Chemistry*, **2021**, 32, 731-757.

39. Ahmadi, A.A.; Kassaei, M.Z.; Ayoubi-Chianeh, M.; Fattahi, A.R., "New pathways of stability for NHCs derived from azole, di-azole, n-tetrazole, and ab-tetrazole, by DFT" *Journal of Molecular Modeling*, **2020**, 26 (11), 324.
40. Safaei, S.; Kassaei, M.Z.; Khorshidvand, N.; Ahmadi, A.A., "Effects of H-bonding and structural constituents on the acidity and potential "anticancer activity" of D-mandelonitrile- β -D-glucuronic acid by density functional theory", *Research on Chemical Intermediates*, **2020**, 46, 4359-4381.
41. Soleimani Purlak, N.; Kassaei, M.Z., "From singlet R₂Si silylene to triplet R₂Si=Si ground state by DFT", *Journal of Physical Organic Chemistry*, **2020**, 33 (6), e4053.
42. Kassaei, M.Z.; Khorshidvand, N., "Study of electronic effects on normal vs. abnormal tetrazol-5-ylidenes at DFT", *Iranian J. Chem. Chem. Eng.*, **2020**, 39 (6), 63-74.
43. Ayoubi-Chianeh, M.; Kassaei, M.Z., "Novel halogenated cyclopentasilene-2,4-dienes via DFT", *Journal of the Chinese Chemical Society*, **2020**, 67 (5), 692-702.
44. Abedini, N.; Kassaei, M.Z., "A theoretical investigation into novel germynes: Effects of nitrogen substitution on stability and multiplicity", *Journal of Molecular Modeling*, **2020**, 26, 1-11.
45. Mohebi, N.; Kassaei, M.Z., "New N-heterocyclic plumbynes (NHPbs) and their complexes with palladium and platinum by DFT", *Structural Chemistry*, **2020**, 32, 731-757.
46. Mohebi, N.; Kassaei, M.Z., "Predicting novel strong acids of plumblyne at theoretical levels", *Journal of Physical Organic Chemistry*, **2020**, 34 (2), e4139.
47. Abedini, N.; Kassaei, M.Z., "Novel azaborastannynes by DFT", *Computational and Theoretical Chemistry*, **2020**, 1190, 1-7.
48. Ayoubi-Chianeh, M.; Kassaei, M. Z., "Novel silylphenol antioxidants by density functional theory", *Journal of the Chinese Chemical Society*, **2020**, 67 (11), 1986-1991.
49. Abedini, N.; Kassaei, M.Z.; Cummings, P.T., "Effects of nitrogen atoms on the stability and reactivity of tricyclicboracarbenes by DFT", *Theoretical Chemistry Accounts*, **2020**, 139, 1-11.
50. Ayoubi-Chianeh, M.; Kassaei, M.Z. "A quest for (sila)₀₋₄ cyclopentasilynes and their Arduengo analogs by DFT", *Silicon*, **2020**, 13, 960-939.
51. Ayoubi-Chianeh, M.; Kassaei, M.Z., "Silicon photosensitizers in cancer therapy: Theoretical studies on novel 5-methoxypsoralens", *Journal of Physical Organic Chemistry*, **2020**, 32 (12), e4007.
52. Ayoubi-Chianeh, M.; Kassaei, M.Z., "Detection of bendamustine anti-cancer drug via AlN and Si-doped C nanocone and nanosheet sensors by DFT", *Structural Chemistry*, **2020**, 31, 2041-2050.

53. Ayoubi-Chianeh, M.; Kassaee, M.Z., "New monodentate and bidentate silylene ligands by DFT", *Journal of the Chinese Chemical Society*, **2020**, 67 (9), 1544-1551.
54. Ayoubi-Chianeh, M.; Kassaee, M.Z., "Novel triplet silavinylidenes via density functional theory", *Journal of Physical Organic Chemistry*, **2020**, 33 (9), e4074.
55. Ayoubi-Chianeh, M.; Kassaee, M.Z., "DFT Study of new P-heterocyclic silylenes", *Journal of Structural Chemistry*, **2020**, 61, 1079-1087.
56. Khorshidvand, N.; Kassaee, M.Z.; Safaei, S., "Substituent effects on novel diaminovinylidenes by DFT", *Research on Chemical Intermediates*, **2020**, 46, 2289-2308.
57. Ashenagar, S.; Kassaee, M.Z.; Khorshidvand, N., "Novel tetrazol-5-germavinylidenes with triplet monomeric, normal, and abnormal forms studied using DFT method", *Journal of Physical Organic Chemistry*, **2019**, 33 (5), 1-9.
58. Behboudi, F.; Tahmasebi Sarvestani, Z.; Kassaee, M.Z.; Modares Sanavi, A.M.; Soroshzade, A.; Ahmadi, B., "Comparative effects of chitosan and SiO₂ nanoparticles on seed germination of barley (*Hordeum vulgare* L.)", *Agricultural Science Letters*, **2019**, 1, 28-36.
59. Ashenagar, S.; Kassaee, M.Z.; Cummings, P., "Novel triplet germylenes in focus: normal vs. abnormal triplet exocyclic tetrazol-5-vinylidene germylenes at DFT", *Journal of Molecular Modeling*, **2019**, 25, 371.
60. Khorshidvand, N.; Kassaee, M.Z., "Electronic effects on diaminocarbenes: a theoretical quest", *Journal of Physical Organic Chemistry*, **2019**, 32 (10), e3996.
61. Zamanzadeh, A.H.; Mohebi, N.; Kassaee, M.Z.; Cumming, P.T.; Dong, K., "Novel N-heterocyclic Stannylenes (NHSns) Using DFT", *Iranian Chemical Society*, **2019**, 7 (3), 511-521.
62. Ayoubi-Chianeh, M.; Kassaee, M.Z., "Novel silicon super bases at DFT level of theory: Effects of fused benzene rings on the basicity of 2,4,6-cycloheptatrienesilylene", *Research on Chemical Intermediates*, **2019**, 45, 4677- 4691.
63. Nasresfahani, Z.; Kassaee, M.Z.; Eidi, E., "Efficient synthesis of α -aminonitriles over homopiperazine sulfamic acid functionalized mesoporous silica nanoparticles (MSNs-HPZ-SO₃H), as a reusable acid catalyst," *Journal of the Iranian Chemical Society*, **2019**, 16, 1819-1825.
64. Ayoubi-Chianeh, M.; Kassaee, M.Z.; Ashenagar, S.; Cumming, P., "Nucleophilicity of cyclic conjugated silylenes using DFT method", *Journal of Physical Organic Chemistry*, **2019**, 32 (8), e3956.
65. Kassaee, M.Z.; Khorshidvand, N.; Ahmadi, A.A.; Cummings, P.T., "Steric effects on normal and abnormal acyclic, cyclic-saturated, and cyclic-unsaturated diaminocarbenes using DFT method", *Journal of Physical Organic Chemistry*, **2019**, 32 (2), e3898.
66. Miranzadeh, M.; Kassaee, M. Z.; Sadeghi, L., "Analysis of Preservative Capacity for Contemporary Iranian Shampoos", *Adv J Chem A*, **2019**, 2 (1), 45-56.

67. Eidi, E.; Kassaee, M.Z.; Nasresfahani, Z.; Cummings, P., "Gallic acid-functionalized magnetic nanoparticles: A convenient and green approach for synthesis of α -aminonitriles under solvent-free conditions", *Research on Chemical Intermediates*, **2019**, *45*, 303-314.
68. Behboudi, F.; TahmasebiSarvestani, Z.; Kassaee, M.Z.; ModarresSanavy, A.M.; Sorooshzadeh, A.; MokhtassiBidgoli, A., "Evaluation of chitosan nanoparticles effects with two application methods on wheat under drought stress", *Journal of Plant Nutrition*, **2019**, *42* (13), 1439-1451.
69. Ayoubi-Chianeh, M.; Kassaee, M.Z., "Toward triplet disilavinylidenes: A Hammett electronic survey for substituent effects on singlet-triplet energy gaps of silylenes by DFT ", *Journal of Physical Organic Chemistry*, **2019**, *32* (10), e3988.
70. Mousavi-Mashhadi, A.; Kassaee, M.Z.; Eidi, E., "Magnetically recyclable nano copper/chitosan in O-arylation of phenols with aryl halides", *Applied Organometallic Chemistry*, **2019**, *33* (9), e5042.
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73. Nasresfahani, Z.; Kassaee, M.Z., "Cu (II) immobilized on mesoporous organosilica as an efficient and reusable nanocatalyst for one-pot Biginelli reaction under solvent-free conditions", *Applied Organometallic Chemistry*, **2018**, *32*, e4106.
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75. Eidi, E.; Kassaee, M.Z.; Nasresfahani, Z.; Cummings, P., "Synthesis of quinazolines over recyclable Fe₃O₄@SiO₂-PrNH₂-Fe³⁺ nanoparticles: A green, efficient, and solvent-free protocol", *Applied Organometallic Chemistry*, **2018**, *32*, e4573.
76. Ashenagar, S.; Kassaee, M.Z., "New triplet silylenes M-Si-M'-X along with some unusual cyclic forms (M = Li, Na, and K; M' = Be, Mg, and Ca; X = F, Cl, and Br)", *Turkish Journal of Chemistry*, **2018**, *42*, 974-987.
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- (*Hordeum vulgare* L.) Under late season drought stress**, *J. Water Environ Nanotechnology*, **2018**, 3, 22-39.
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234. **OKassaee, M.Z.**; Azarnia, J.; Arshadi, S., "**1, 2, 4, 6-Cycloheptatetraenes racemizations: substituent effects *via ab initio***", *Journal of Molecular Structure: THEOCHEM*, **2004**, 686 (1), 115-122.
235. Ghaemi, M.; Ghavami, R.; Khosravi-Fard, L.; **Kassaee, M.Z.**," **Electrolytic MnO₂ via nonisothermal electrode heating: a promising approach for optimizing performances of electroactive materials**", *Journal of Power Sources*, **2004**, 125 (2), 256-266.
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237. **Kassaee, M.Z.**; Bekhradnia, A.R., "**Role of the gut flora in toxicity and cancer: Role of the gut flora in toxicity and cancer**", *Journal of Bioscience and Bioengineering*, **2003**, 95 (5), 526-529.
238. **Kassaee, M. Z.**; Bekhradnia, A. R., "**The kinetics of interactions between fecapentaene-12 and DNA**", *Journal of Bioscience and Bioengineering*, **2003**, 95 (5), 526-529.
239. **Kassaee, M.Z.**; Haerizade, B.; Arshadi, S., "**Halogenated isomers of the interstellar C₃H₂: an *ab initio* comparative study**", *Journal of Molecular Structure: THEOCHEM*, **2003**, 639 (1), 187-193.
240. **Kassaee, M.Z.**; Beigi, M.; Arshadi, S., "***Ab initio* investigations of structural and energetic properties of hindered aryl alkyl ketones**", *Journal of Molecular Structure: THEOCHEM*, **2003**, 624 (1), 69-79.
241. Ghaemi, M.; Amrollahi, R.; Ataherian, F.; **Kassaee, M.Z.**, "**New advances on bipolar rechargeable alkaline manganese dioxide–zinc batteries**", *Journal of Power Sources*, **2003**, 117 (1), 233-241.
242. **Kassaee, M.Z.**; Heydari, H.; Hattami, M.; Nia, "A. F., **¹³C Spin– Lattice Relaxation times and NOE related studies of hydroxyl-terminated polybutadiene (HTPB)**", *Macromolecules*, **2003**, 36 (18), 6773-6779.
243. **Kassaee, M.Z.**; Arshadi, S.; Beigi, M., "***Ab initio* study of conformational energy surface of spiro [cyclohexane-1, 2'-(1', 3'-dioxep-5'-ene)]**", *Journal of Molecular Structure: THEOCHEM*, **2002**, 589, 153-159.
244. **Kassaee, M.Z.**; Nassari, M., "**The effects of substituents on the photochemistry of β -methyl β -nitrostyrene**", *Journal of Photochemistry and Photobiology A: Chemistry*, **2000**, 136 (1-2), 41-48.
245. **Kassaee, M.Z.**; Nimlos, M.; Downie, K.; Waali, E., "**A mndo study of 3-,5-,7-and 9-membered carbocyclic, completely conjugated, planar carbenes and their nonplanar isomers**", *Tetrahedron*, **1985**, 41 (8), 1579-1586.

Patents

1. M.Z. Kassaee*, M. Ghavami, S.E. Motamedi., "**Synthesis of nano-copper and nano-copper oxide *via* arc discharge in the open air**", *Iranian Patent* 007689, **2006**, Tehran, Iran.
2. M. Z. Kassaee*, M. Ghavami, A. Cheshmekhiani., "**Synthesis of neuro-nano- nets (NNN) *via* arc discharge in the open air**", *Iranian Patent* 005865, **2006**, Tehran, Iran

3. M. Z. Kassaee*, M. Ghavami, M. Majdi., "Synthesis of nano grape clusters of dihydroxy acetone dimmer", *Iranian Patent* 005252, **2006**, Tehran, Iran.
4. M. Z. Kassaee*, A. Mikhak, M. Faizian., "Synthesis of compound nano-zeolite fertilizer with nano-hydroxyapatite", *Iranian Patent* 100278, **2016**, Tehran, Iran.
5. M. Z. Kassaee*, A. Mikhak., "Recyclable nano Fe(OH)₃/Zeolite in efficient phosphate removal from water", *Iranian Patent* 100279, **2015**, Tehran, Iran.
6. Kassaee, M. Z.; Ashenagar, S.; Shabani, I.; Mohamadi, M. **2018**, International Classification of Patent: A61K 67/8; A61K 00/8.

Chemistry Courses Taught

PhD level

- Advanced NMR
- Photochemistry
- Synthetic Methods in Organic Chemistry
- New Topics in Organic Chemistry (Nanotechnology; Computational Chemistry; Mas Advanced NMR Spectroscopy;
- Industrial Chemistry;
- Organic Reactive Intermediates

MS level

- Advanced Organic Chemistry
- Molecular Spectroscopy I
- Organic Synthesis
- Petrochemicals and their Technology
- Petroleum Chemistry
- Physical Organic Chemistry

BS level

- General Chemistry I & II
- Organic Chemistry I, II & III
- Polymer Chemistry

Graduate students supervised

Ph.D. Theses Supervised

1. "Capture of CO₂ by novel vinylidenes at theoretical levels", S. Soroudi, February **2023**, Tarbiat Modares University.

2. Computational study of Cu, Ag and Au as antioxidants and a glance at the mechanism of Diels-Alder reaction involving carbenes", B. Alipour, July **2024**, Tarbiat Modares University.
3. "Preparation and identification of organocatalysts immobilized on the substrate of magnetic nanoparticles and studying their applications in organic reactions", S. Mohammadian, October **2023**, Tarbiat Modares University.
4. "Catalytic Synthesis of Desired Organic Compounds *via* Selected Functionalized Magnetic Nanoparticles", F. Nasser, January **2024**, Tarbiat Modares University.
5. "Computational scrutiny on a few novel triplet silylenes", N. Soleimani Purlak, August **2022**, Tarbiat Modares University.
6. "Study on new plumbylenes and novel phenolic antioxidants at theoretical levels", N. Mohebi, January **2021**, Tarbiat Modares University.
7. "Experimental scrutiny and theoretical investigations on controversial "Vitamin B17 " plus a computational study on a new brand of cyclic conjugated germylene", S. Safaei, June **2021**, Tarbiat Modares University.
8. "Theoretical study of new silylenes", M. Ayoubi Chianeh, July **2020**, Tarbiat Modares University.
9. "A theoretical reach for unreachable germynes and synthesis of a nano-composite *via* [vitamin C / titanium dioxide / zinc oxide]", S. Ashenagar, June **2020**, Tarbiat Modares University.
10. "Novel diaminocarbenes, vinylidenes, phosphinidenes and reaction of selected carbenes with CO₂ by DFT", N. Khorshidvand, October **2019**, Tarbiat Modares University.
11. "Computational and experimental study of some cholesterol drugs and review of divalent group 14 element compounds", A.A. Ahmadi, April **2019**, Tarbiat Modares University.
12. "The effect of nano silicon dioxide and chitosan nanoparticles on some agronomic characteristics of wheat (*Triticum aestivum* L.) and barley (*Hordeum vulgare* L.) under late season drought stress", F. Behboudi, April **2018**, Tarbiat Modares University.
13. "Synthesis and catalytic applications of mesoporous silica nanoparticles in selected organic reactions", Z. Nasresfahani, September **2017**, Tarbiat Modares University.
14. "Synthesis of selected organo nanocomposites of silver and their applications in detergents, electric cables, and construction materials", M. Miranzadeh, July **2016**, Tarbiat Modares University.
15. "A theoretical quest for stable carbenes and experimental employment of nano ZnO synthesis, plus using a nano Ag complex in water treatment" B.N. Haerizade, December **2014**, Tarbiat Modares University.

16. "Synthesis and characterization of organic based nano catalyst and mass spectral distinction between chiral alcohols under achiral conditions", E. Eidi, August **2014**, Tarbiat Modares University.
17. "Synthesis of nano Fe_3O_4 and TiO_2 and their catalytic applications in selected thermal and photochemical reactions", M. Ghavami, April **2014**, Tarbiat Modares University.
18. "Synthesis of metal oxide nanoparticles anchored by natural products as reusable catalysts in organic reactions", R. Mohammadi, September **2014**, Tarbiat Modares University.
19. "Investigations of stable conjugated bivalent N-heterocycles and indoline-2-thione derivatives and their ring addition to fullerene C_{20} by computational methods", M. Kohi, September **2013**, Tarbiat Modares University.
20. "Synthesis of nano-metalic oxides and their application in the synthesis of selenides and polymer nanocomposites", E. Motamedi, September **2012**, Tarbiat Modares University.
21. "Theoretical studies on silylenes, cyclacenes and nanotubes of silicon", H. Zandi, March **2012**, Tarbiat Modares University.
22. "Investigation of metal oxide nano catalysts in synthesis of heterocyclic compounds", H. Masrouri, June **2011**, Tarbiat Modares University.
23. "Synthesis of zinc oxide nanoparticles and its applications in multicomponent reactions", F. Movahedi, March **2011**, Tarbiat Modares University.
24. "A computational study on the structure and characteristics of carbenes and their catalytic action in organic reactions", M. Ghambarian, February **2011**, Tarbiat Modares University.
25. "Radiation synthesis of silver nanoparticles in organic stabilizers and their antibacterial activities", A. Akhavan, January **2010**, Tarbiat Modares University.
26. "Reaching for the characteristics of specific nano rings, nanoribbons and nanotubes *via* computations", H. ArefRad, February **2010**, Tarbiat Modares University.
27. "Arc discharge synthesis, characterization and application of metal nanoparticle and theoretical studies on nano rings and group 14 compounds", F. Buazar, October **2009**, Tarbiat Modares University.
28. "Study of selected organic reactive intermediate in groups 14&15 and synthesis of nano tungsten particles", S. Soleimani Amiri, February **2009**, Tarbiat Modares University.
29. "Computational studies on the selected carbenes and their heavier group 14 analogues", S.M. Musavi, September **2006**, Tarbiat Modares University.
30. "Study of reaction and photo-reaction of olefins, nitro olefins and the related theoretical computations", E. Vessally, September **2005**, Tarbiat Modares University.
31. "Investigation of the steric and electronic effects on the structural and energetic properties of selected organic compounds", S. Arshadi, January **2005**, Tarbiat Modares University.

32. "Syntheses and theoretical studies on the specific biological and pharmacological compounds", A. Bekhradnia, December **2005**, Tarbiat Modares University.
33. "Structural analysis and estimation of HTPB using PM₃ calculations and comparing with experimental", M.H. Hosseinzadeh-Amir Khizi, June **1995**, Tarbiat Modares University.
34. "*ipso*-Nitration of selected aromatic compounds", M. Hashemi Talkhonche, **1995**, Tarbiat Modares University.

M.S. Theses Supervised

1. "Preparation and characterization of an oxamide functionalized magnetic nanocatalyst and its application in suzuki cross-coupling reactions" A. Daniali, **July 2022**, Tarbiat Modares University.
2. "Application of enantiomerically blind electron impact mass spectroscopy in distinction between enantiomers and chemical education", A. Mojtahedi, March **2019**, Tarbiat Modares University.
3. "Comparison between steric effects on dithia carbenes, silylenes, germylenes, stanylenes and plumbenes at DFT", K. Rahmi, October **2019**, Tarbiat Modares University.
4. "Design and synthesis of new organocatalysts and their employment in selected organic reactions", A. Mousavi, **2018**, Tarbiat Modares University.
5. "Synthesis and applications of novel Cu(II) coated magnetic gum Arabic nanoparticles in coupling, oxidation, and multicomponent reactions", A. Farrokhi, September **2017**, Tarbiat Modares University.
6. "Synthesis and production of recyclable nano-adsorbants for purification of water", M.S. Doryab, March **2017**, Tarbiat Modares University.
7. "Preparation and Synthetic Applications of Selected Nanocatalysts over Organic-Inorganic Supports", M. Nejati Shendi, February **2017**, Tarbiat Modares University.
8. "Nanotechnology and conservation of stone monuments of the cultural heritage; (case study: pasargad and perspolis world heritage sites)", M. Haydari, **2017**, Tarbiat Modares University.
9. "Reaching for new N-heterocyclic carbenes and their intractions with carbon nanotubes", N. Rezaee, December **2015**, Tarbiat Modares University.
10. "Synthesis and characterization of magnetic chitosan nano-composites for removal of heavy metals and distinction between geometrical isomers *via* mass spectroscopy", M. Mirabedini, December **2014**, Tarbiat Modares University.

11. "Synthesis and characterization of organic based nano-catalyst and mass spectral distinction between chiral alcohols under achiral conditions", E. Eidi, September **2014**, Tarbiat Modares University.
12. "New perspectives at the interface of nano-organic chemistry and endodontics: Reaching for biocompatible and permeable irrigants", Sh. Hosseini, December **2014**, Tarbiat Modares University.
13. " Comparative Investigation of Dielectric Properties of Ethylene Propylene Rubber (EPR) Composites Containing Metallic, Ceramic Nanoparticles or their Combinations ", M. Sadroddini, January **2014**, Tarbiat Modares University
14. "The effects of iron oxide nano particles on differentiation of mice mesenchymal stem cell to osteoblast", L. Dini, December **2013**, Azad University.
15. "Synthesis of graphenic nanocomposites and their comparison with Fe and Al nanoparticles in removing toxic arsenic from water", S. Poursadeghi, September **2013**, Tarbiat Modares University.
16. "Applications of aluminum nanoparticles and salts of gallium and aluminum in organic synthesis", M. Ghader, December **2012**, Tarbiat Modares University.
17. "The synthesis of modified nano silica catalysts by coordinated ligands with metals and their applications in organic synthesis ", M. Mohadesi, March **2012**, Tarbiat Modares University.
18. "Effects of alfa substituents on stability and reactivity of acyclic, cyclic and cyclic unsaturated silylene", Z. Sadate Najafi, January **2011**, Tarbiat Modares University.
19. "Nitrate decontamination using quarts supported Fe nanoparticles", A. Mikhak, March **2010**, Tarbiat Modares University.
20. "Syntheses and characterizations of silica based heterogeneous nano catalysts and their applications in specific multicomponent reactions", S. Amirnejat, March **2010**, Tarbiat Modares University.
21. "Syntheesis of silver nanoparticles by chemical reduction method and the investigation of different effective parameters on the size and shape of nanoparticles", M. Mohammadkhani, June **2010**, Tarbiat Modares University.
22. "Investigation of catalytic effect of TiO₂ nanoparticles in condensation reactions", R. Mohammadi, March **2010**, Tarbiat Modares University.
23. "Synthesis of nano iron oxide and theoretical studies on the selected organic compounds " A. Cheshmehkani, Winter **2008**, Tarbiat Modares University.

24. "Synthesis of nickel nanoparticles and study on selected organic species ", M. Majdi, January **2008**, Tarbiat Modares University.
25. "Computational study of the steric effects on thiepin/benzene sulfide tautomerization and benzene-fused compounds", M.R. Momeni Taheri, September **2008**, Tarbiat Modares University.
26. "Computational study of the rearrangements of silacyclohexadienylidenes to silabenzene and pyridine-carbene tautomerization", F. AlipourShakib, September **2008**, Tarbiat Modares University.
27. "Synthesis of metallic nanoparticles and energy calculation of some organic compounds", M. Ghavami, February **2007**, Tarbiat Modares University.
28. "Synthesis of copper and copper oxide nanoparticles and theoretical studies on the selected organic compounds", E. Motamedi, November **2007**, Tarbiat Modares University.
29. "Theoretical or experimental study on special organic species", N. Jalalimanesh, September **2006**, Tarbiat Modares University.
30. "Racemizations of cyclic conjugated non-planar allenes, C_9H_7X , through their corresponding cyclic planar carbenes", M. Koohi, February **2005**, Tarbiat Modares University.
31. "Quantum chemical studies on interstellar carbene homologues and solvent effect on HTPB dynamics", F. Buazar, September **2005**, Tarbiat Modares University.
32. "Theoretical studies on X-Ge-CN and Ge-CP germylenes ($X = H, F, Cl$ and Br)", M. Ghambarian, December **2005**, Tarbiat Modares University.
33. "Investigation of the steric and electronic effects on some selected organic compounds", B.N. Haerizadeh, February **2004**, Tarbiat Modares University.
34. "Solvent effects on dynamics of HTPB and a new method for synthesis of oxidants", M. Hattami, May **2004**, Tarbiat Modares University.
35. "Synthesis of new oxidant for selective oxidation of alcohols to the corresponding aldehydes and ketones", H. Sajjadi-Ghotbabadi, February **2003**, Tarbiat Modares University.
36. "Synthesis of new oxidants for selective oxidation of organic compounds", S.Z. Sayyed Alangi, December **2003**, Tarbiat Modares University.
37. "Investigation of the steric effects on the structural and energetic properties of selected organic compounds", M. Beigi, October **2002**, Tarbiat Modares University.
38. "Synthesis of derivatives of furazan", I. Kahsari, February **2001**, Tarbiat Modares University.

39. "Chemistry of FP-12 a potential (cause of colon cancer)", M. Sadeghi, August **1999**, Shahroud Azad University.
40. "Recovery and purification of glycerol from wastewater", A. Hadi, Winter**1998**, Tarbiat Modares University.
41. "The chemistry of FP-12 (A potential inducer of colon cancer)", M.J. Rezaov, Summer **1998**, Tarbiat Modares University.
42. "The study of HTPB degradation *via* NMR relaxation times T_1 (^{13}C)", A. Fazli Nia, Winter **1998**, Tarbiat Modares University.
43. "The molecular structural relationship of FP-12 and related compounds to their ionic solvolysis *via* quantum chemical calculations", R. Nowrozy, Summer **1997**, Islamic Azad University, Shahrood branch.
44. "Quantum Chemical analysis of the free radical solvolysis of a possible inducer of colon cancer and related compounds", M. Amanbaee, Summer **1997**, Islamic Azad University, Shahrood branch.
45. "Analysis of industrial gases using GC/MS methods", M. Basam, Spring **1995**, Tarbiat Modares University.
46. "An NMR Relaxation study of PBD dynamics", H. Heydari, Fall **1995**, Tarbiat Modares University.
47. "Study of HTPB *via* NMR and computer", F. Goranlou, January **1995**, Tarbiat Modares University.
48. "*ipso*-Nitration of selected aromatics", M. Hashemi Talkhonche, January **1995**, Tarbiat Modares University.
49. "Separation and identification of components of jet fuel GC/MS and NMR", F. Gholamian, August **1994**, Tarbiat Modares University.
50. "The effect of FeCl_2 on the rate of Photo rearrangement of *p*-nitrostyrene", M.A. Naseri, October **1994**, Tarbiat Modares University.
51. "The analyses of aromatic components of petroleum (Maroon-3) by chromatography and NMR", F.A. Salhe-Rad, March **1988**, Tehran University.

Seminars (Selected 245 papers)

1. Ahmadi, A.A.; **Kassaee, M.Z.**; Fatahi, A.R., "Planar stacking interactions in the binding of type II statins to HMG-COA reductase", **2018**, *20th Iranian Chemistry Congress*.
2. Khorshidvand, N.; Eidi, E.; **Kassaee, M.Z.**, "Synthesis and characterization of DCC supported on magnetic nanoparticles a highly active and recyclable catalyst for the synthesis of polyhydroquinolines", **2018**, *20th Iranian Chemistry Congress*.
3. Eidi, E.; **Kassaee, M.Z.**; Mousavi Mashhadi, S.A., "Magnetic niacin sulfonated a highly efficient and green catalyst for synthesis of alpha-aminonitrils under solvent- free conditions", **2018**, *1st Iranian Catalyst Conference (ICC)*.
4. Safaie, S.; **Kassaee, M.Z.**, "Factors affecting on the acidic site of prunasin in gas phase, water and DMSO", **2018**, *20th Iranian Chemistry Congress*.
5. Ayoubi, M.; **Kassaee, M.Z.**, "Computational study of polycyclic unsaturated silylenes and their allenic analogs", **2018**, *20th Iranian Chemistry Congress*.
6. Mohebbi, N.; **Kassaee, M.Z.**, "Substituent effects on thermodynamic parameters of new plumblylenes at DFT", **2018**, *20th Iranian Chemistry Congress*.
7. Khorshidvand, N.; **Kassaee, M.Z.**, "Electronic effects on normal and abnormal acyclic cyclic-saturated and cyclic-unsaturated diaminocarbenes at DFT", **2018**, *20th Iranian Chemistry Congress*.
8. Nasreesfehiani, Z.; **Kassaee, M.Z.**; Eidi, E., "Ionic liquid functionalized mesoporous silica nanoparticles (pmimFeCl₄/MSNs) efficient nanocatalyst for solventfree synthesis of NN-diarylsbstituted formamidines", **2018**, *20th Iranian Chemistry Congress*.
9. Eidi, E.; **Kassaee, M.Z.**, "Synthesis of quinazolines over recyclable Fe₃O₄SiO₂-APTES-Fe₃ nanoparticles a green efficient and solvent-free protocol", **2018**, *20th Iranian Chemistry Congress*.
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Translations

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Book

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Research interests

1. Computational chemistry of carbenes, silylenes and germynes.
2. Solar energy storage norbornadiene quadricyclane systems.
3. Photochemistry of nitro-nitrite rearrangements.
4. Petroleum chemistry.
5. Nano-chemistry.
6. Industrial and food chemistry.
7. Polymer chemistry: NMR dynamic models.
8. Colon cancer research: FP-12 interactions with DNA.

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