

# Curriculum Vitae

مریم صباغان

دانشیار دانشگاه تربیت دبیر شهید رجایی، گروه شیمی

ایمیل: msaba16us@yahoo.com, Sabbaghan@sru.ac.ir

سوابق آموزشی:

## EDUCATIONAL BACKGROUND

- 2017-Now**  
Institution: Associate Professor in Organic Chemistry  
Shahid Rajaei Teacher Training University (SRTTU)-Tehran-Iran.  
Research Topic: Synthesis and optical properties of nanoparticles in ionic liquids and their application as catalyst in organic synthesis.  
Education in Green Chemistry  
Microporous & Mesoporous system synthesis
- 2011-2016**  
Institution: Assistant Professor in Organic Chemistry  
Shahid Rajaei Teacher Training University (SRTTU)-Tehran-Iran.  
Research Topic: Synthesis and optical properties of nanoparticles in ionic liquids and their application as catalyst in organic synthesis.
- 2003-2007**  
Institution: Phd Student-Organic Chemistry  
Tarbiat Modares University (TMU)-Tehran-Iran  
Research Topic: Synthesis of Heterocyclic Systems using Multicomponent Reactions of Polycarbonyl Compounds
- 1994-1997**  
Institution: Master of Science  
University of Tehran (UT)-Tehran-Iran  
Research Topic: Synthesis of diphenic acid derivatives, kinetic, DNMR, semiempirical quantum mechanics studies.
- 1990-1994**  
Institution: Bachelor of Science  
Kharazmi University-Tehran-Iran

زمینه های تحقیقاتی:

## RESEARCH EXPERIENCES

- Experimental studies on synthesis different morphologies of nanostructures and their optical properties
- Application of Nanostructures in Organic Synthesis
- Synthesis and identification of new compounds using Multicomponent Reaction
- Synthesis of mesoporous material
- Education in Chemistry

تدریس:

## TEACHING EXPERIENCE

- 
- Organic Chemistry I, II, III
  - Advance Organic Chemistry
  - The Systematic Identification of Organic Compounds
  - Spectrometric identification of organic compounds
  - Physical organic chemistry
  - General Chemistry
  - Literature Survey in Chemistry
  - English for Specific Purpose (chemistry)
  - Pre-University Chemistry I, II

مقالات ISI:

## PUBLICATIONS

1. Hossein Karami, **Maryam Sabbaghan**, Zinatossadat Hossaini, Faramarz Rostami-Charati, Ionic Liquid-assisted Preparation of 2D ZnO/Fe<sub>3</sub>O<sub>4</sub> nanocomposites and their application in polysubstituted pyrroles synthesis, *Combinatorial Chemistry & High Throughput Screening*. Accepted, 2020.
2. **Maryam Sabbaghan**, Pegah Sofalgar, Mehrdad Zarinejad, Ionic liquid-based controllable synthesis of MgO nanostructures for high specific surface area, *Ceramics International*, 2019 online.
3. **Maryam Sabbaghan** Hossein Charkhan, Masoumeh Ghalkhani, Javad Beheshtian, Ultrasonic route synthesis, characterization and electrochemical study of graphene oxide and reduced graphene oxide, accepted in *Research on Chemical Intermediates* 2019, 45, 487–505.
4. Pegah Sofalgar, **Maryam Sabbaghan**, M. Reza Naimi-Jamal, Green synthesis of 2D Fe<sub>3</sub>O<sub>4</sub>/Mg(OH)<sub>2</sub> and 2D Fe<sub>3</sub>O<sub>4</sub>/MgO nanocomposites using [OMIM]Br ionic liquid and investigation of their catalytic activity, *Plycyclic Aromatic Compound* 2019, accepted.
5. Mohammad Bigdeli, **Maryam Sabbaghan**, Marjan Esfahanizadeh, Farzad Kobarfard, Sara Vitalini, Marcello Iriti, Javad Sharifi-Rad, Synthesis of Imine Congeners of Resveratrol and Evaluation of Their Anti-Platelet Activity, *Molbank* 2019, 1, M1039.
6. Hossein Karami, Zinatossadat Hossaini, **Maryam Sabbaghan**, Faramarz Rostami-Charati, One-Pot synthesis of highly substituted pyrroles by three component reactions of ninhydrin, *Chemistry of Heterocyclic Compounds* 2018, 54, 1040-1044.
7. **Maryam Sabbaghan**, Dimitris S. Argyropoulos, Synthesis and Characterization of Nano Fibrillated Cellulose/Cu<sub>2</sub>O Films; Micro and Nano Particle Nucleation Effects Cellulose/Cu<sub>2</sub>O Films; Micro and Nano Particle Nucleation Effects, *Carbohydrate Polymers*. 2018, 197, 614–622.
8. Haleh Sanaeishoar, **Maryam Sabbaghan**, Dimitris S. Argyropoulos, Ultrasound assisted polyacrylamide grafting on nano-fibrillated cellulose *Carbohydrate Polymers*. 2018, 181, 1071-1077.

9. **Maryam Sabbaghan**, Forough Adhami, Mohadese Aminnezhad. "Preparation, Characterization and Catalytic Properties of Jarosite/MnO<sub>2</sub> and Goethite/MnO<sub>2</sub> Nanocomposites, Journal of Structural Chemistry 2018, 59, 480-489.
10. Ashraf Sadat Shahvelayati, **Maryam Sabbaghan**, Solmaz banihashem, Sonochemically assisted synthesis of *N*-substituted pyrroles catalyzed by ZnO nanoparticle under solvent-free conditions. Monatshefte für Chemie-Chemical Monthly 2017, 148 (6), 1123-1129.
11. Haleh Sanaeishoar, **Maryam Sabbaghan**, Fouad Mohave, Roya Nazarpour, Disordered mesoporous KIT-1 synthesized by DABCO-based ionic liquid and its Characterization, Microporous & Mesoporous Materials. 2016, 228, 305-309.
12. **Maryam Sabbaghan**, Pegah sofalgar. "Green Synthesis and Magnetic Characterization of Single-phase  $\gamma$ -Fe<sub>2</sub>O<sub>3</sub> NanoParticles by Ionothermal Method. Ceramics International, 2016, 42, 16813–16816.
13. **Maryam Sabbaghan**, Ashraf Sadat Shahvelayati, Solmaz banihashem, Green Synthesis of Symmetrical Imidazolium Based Ionic Liquids and their Application in the Preparation of ZnO Nanostructures, Ceramics International, 2016, 42, 3820-3825.
14. Haleh Sanaeishoar, **Maryam Sabbaghan**, Fouad Mohave, Synthesis and characterization of micro/mesoporous MCM-41 using various ionic liquids as co-templates, Microporous & Mesoporous Materials. 2015, 217, 219-224.
15. Ashraf Sadat Shahvelayati, **Maryam Sabbaghan**, Solmaz banihashem, Catalytic Synthesis *N*-alkyl-3-acetyl-2-methylpyrroles using ZnO Nanostructure. Int. J. Bio-Inorg. Hybr. Nanomater., 2015, 4, 11-16.
16. **Maryam Sabbaghan**, Ali Yousefi, "Synthesis of 2,3,4-Furan Tricarboxylate in Biphasic Water/Et<sub>2</sub>O Solvent System", Chemistry of Heterocyclic Compounds 2015, 51(9), 804–807.
17. **Maryam Sabbaghan**, Haleh Sanaeishoar, Azam Ghalaei, Pegah Sofalgar, "Solvent-free Synthesis of Polysubstituted Pyrroles Catalyzed by ZnO Nanorods", Journal of the Iranian Chemical Society. 2015, 12, 2199-2204.
18. **Maryam Sabbaghan**, Javad Beheshtian, Rasoul Niazmand, Preparation of Cu<sub>2</sub>O Nanostructures by Changing Reducing Agent and Their Optical Properties, Materials Letters, 2015, 153, 1–4.
19. Ashraf Sadat Shahvelayati, **Maryam Sabbaghan**, Seyede Elahe Bashtani "The Effect of Various Substitutions in Imidazolium-based Ionic Liquids on Morphology and Optical Properties of ZnO Nanostructures, "International Journal of Nanoscience and Nanotechnology. 2015, 11, 123-131.
20. **Maryam Sabbaghan**, Pegah Sofalgar, Ultrasonic Assisted Synthesis of Chromenes Catalyzed by Sodium Carbonate in Aqueous Media. 2015, Combinatorial Chemistry & High Throughput Screening. 2015, 18, 901-910.
21. **Maryam Sabbaghan**, Ashraf Sadat Shahvelayati, kamelia madankar, "Optical properties and morphology control of CuO nanostructures in Pyridinium-Based Ionic Liquids", Spectrochimica Acta Part A: Molecular and Bimolecular spectroscopy, 2015, 135, 662-668.
22. Azar Bagheri Ghomi, **Maryam Sabbaghan**, Zahra Mirgani, " A comparative study on properties of synthesized MgO with different templates", Spectrochimica Acta Part A: Molecular and Bimolecular spectroscopy, 2015, 137, 1286-1291.
23. **Maryam Sabbaghan**, Behnoosh Mirzaei Behbahani, "Synthesis and Optical Properties of CuO Nanostructures in Imidazolium-Based Ionic Liquids", Materials Letters, 2014, 117, 28-30.
24. **Maryam Sabbaghan**, Javad Beheshtian, Seyed Ali Mohammad Mirsaeidi, Preparation of Uniform 2D ZnO Nanostructures by The Ionic Liquid-assisted sonochemical method and their optical properties, Ceramics International, 2014, 40, 7769–7774.

25. **Maryam Sabbaghan**, Azam Ghalaei "Catalyst Application of ZnO Nanostructures in the Solvent Free Synthesis of Polysubstituted Pyrroles", *Journal of Molecular Liquids*, 2014, 193, 116-122.
26. **Maryam Sabbaghan**, Azam Anaraki Firooz, Vahid Jan Ahmadi, "The effect of template on morphology, optical and photocatalytic properties of ZnO nanostructures" *Journal of Molecular Liquids* 2012, 175, 135-140.
27. **Maryam Sabbaghan**, Ashraf Sadat Shahvelayati, Elahe Sadat bashtani" Synthesis and Optical Properties of ZnO Nanostructures in Imidazolium-Based Ionic Liquids " *Solid State Sciences*, 2012, 14, 1191-1195.
28. Zinatossadat Hossaini, Faramarz Rostami-Charati, Somayeh Firoziyan, **Maryam Sabbaghan** and Mohammad A. Khalilzadeh, "A Simple and Effective Approach to the Synthesis of Isoquinoline Derivatives Under Solvent-Free Conditions" *Combinatorial Chemistry & High Throughput Screening*, 2012, 15, 503-508.
29. **Maryam Sabbaghan**, Zinatossadat Hossaini, "A Highly Efficient Green Synthesis of N-alkyl 2-[(2-oxo-2-aryl ethyl)amino] benzamide Derivatives From Reaction of Isatoic Anhydride, Primary Amines and 2-Bromoacethophenone". *Combinatorial Chemistry & High Throughput Screening*, 2012, 15, 745-748.
30. **Maryam Sabbaghan**, Mostafa Alidoust and Zinatossadat Hossaini "A Rapid, Four-Component Synthesis of Functionalized Thiazoles" *Combinatorial Chemistry & High Throughput Screening* 2011, 14, 824-828.
31. **Maryam Sabbaghan**, Issa Yavari, Zinatossadat Hossaini, "A Novel One-pot Synthesis of Substituted Quinolines" *Helvetica Chimica Acta*, 2010, 93, 946-950.
32. **Maryam Sabbaghan**, Issa Yavari, Zinatossadat Hossaini, "Synthesis of functionalized chromenes from Meldrum's acid, 4-hydroxycoumarin, and ketones or aldehydes" *Combinatorial Chemistry & High Throughput Screening* 2010, 13, 813-817.
33. Issa Yavari, Faeze Shirgahi, **Maryam Sabbaghan**, Zinatossadat Hossaini and Samere Seyfi "Synthesis of Functionalized 1,2,4-Triazole-3-thiones from Ammonium Isothiocyanate, Acid Chlorides, and Arylhydrazines" *Molecular diversity*, 2010, 14, 763-766.
34. Yavari, I.; Hossaini, Z., **Sabbaghan, M.** " One-Pot Synthesis of Functionalized Thiazoles from Reaction of Acid Chlorides, Secondary Amines, Ethyl Bromopyruvate and Ammonium Thiocyanate" *Molecular diversity*, 2009, 13, 295–300.
35. Yavari, I., Zinatossadat Hossaini, **Sabbaghan, M.**, Majid Ghazanfarpour-Darjani, "Synthesis of trisubstituted furans from the reaction of electron-deficient acetylenic compounds with ethyl bromopyruvate in the presence of enamines". *Chemical Monthly* 2008, 139, 945–948.
36. Issa Yavari<sup>1</sup>; S. Zahra Sayyed-Alangi<sup>1</sup>, **Maryam Sabbaghan**, Rahimeh Hajinasiri<sup>1</sup>, Nasir Irvani, "One-pot synthesis of functionalized thioureas by reaction of benzoylisothiocyanates, secondary amines, and alkyl propiolates". *Chemical Monthly*, 2008, 139, 1025–1028.
37. Yavari, I., Ghazanfarpour-Darjani M, Hossaini Z., **Sabbaghan M.**, and Hossein N., "Methoxide-Catalyzed Efficient Synthesis of 1,3-oxathiolane-2-thiones by the reaction of oxirane and carbon disulfide" *Synlett*, 2008, 6, 889-891.
38. Issa Yavari, **Maryam Sabbaghan** and Zinatossadat Hossain "Proline Promoted Efficient Synthesis of 4-Aryl-3,4-dihydro-2H,5H-pyrano[3,2-c]chromene-2,5-diones in Aqueous Media" *Synlett*, 2008, 8, 1153-1154.
39. Issa Yavari, Samereh Seyfi, Zinatossadat Hossaini, **Maryam Sabbaghan**, and Faezeh Shirgahi "Efficient Synthesis of 2-Thioxo-1,3-thiazolanes from Primary Amines, CS<sub>2</sub> and Ethyl Bromopyruvate" *Monatsh Chem*, 2008, 139, 1479–1482.

40. Yavari, I.; Sabbaghan, M.; Hossaini, Z.; Ghazanfarpour-Darjani M. "Surprising formation of chlorinated butenolides from dialkyl acetylenedicarboxylates and hexachloroacetone in the presence of triphenyl phosphite". *Helvetica chemical acta*, 2008, 91, 1144-1147.
41. Yavari, I.; Hossaini, Z.; Souiri, S. and Sabbaghan, M. "Synthesis of 1,3-oxazole Derivatives from the Reaction of Benzoyl isothiocyanate with Ethyl bromopyruvate in the Presence of N-methyl imidazole" *Synlett*, 2008, 9, 1287-1288.
42. Issa Yavari, Hossaini, Z.; Sabbaghan, M. "Synthesis of Tetrasubstituted thiophen by Reaction of isothiocyanate, ethyl bromopyruvate and enamines" *Tetrahedron let.* 2008, 49, 844-846.
43. Yavari, I.; Sabbaghan, M.; Hossaini, Z. "Efficient synthesis of functionalized 2,5-dihydrofurans and 1,5-dihydro-2H-pyrrol-2-ones by reaction of isocyanides with activated acetylenes in the presence of hexachloroacetone" *Chemical Monthly*, 2008, 139, 625-628.
44. Yavari, I.; Sabbaghan, M., Hossaini, N. ; Hossaini, Z.; " Four-component one-pot synthesis of functionalized ynamines from reaction of benzoyl chlorides, secondary amines, acetylenic esters, and ammonium isothiocyanate" *Synlett*, 2007, 20, 3172-3174.
45. Yavari, I.; Sabbaghan, M., Hossaini, Z.; Majid Ghazanfarpour-Darjani, "A Synthesis of 1-Aryl-3,5-dioxo-tetrahydro-1H-pyrazoles from Reaction of Alkyl Isocyanides, Isopropylidene Meldrum's and Arylhydrazines". *J. Chem. Res.*, 2007, 392-393.
46. Yavari, I.; Hossaini, Z.; Sabbaghan, M.; Ghazanfarpour-Darjani, M. "Efficient Synthesis of Functionalized Spiro-2,5-dihydro-1,2-λ<sup>5</sup>-oxaphospholes". *Tetrahedron* 2007, 63, 9423-9428.
47. Yavari, I.; Sabbaghan, M.; Porshamsian, K.; Bagheri, M.; Ali-Askari, S.; Hossaini, Z. "Efficient Synthesis of Alkyl 2-[2-(Arylcarbonylimino)-3-aryl-4-oxo-1,3-thiazolan-5-ylidene]-acetates" *Molecular diversity*, 2007, 11, 81-85.
48. Yavari, I.; Ghazanfarpour-Darjani M., Sabbaghan, M.; Hossaini, Z. "Synthesis of dimethyl (E)-2-[1-[aryl(alkyl)carbonylamino]-2(1H)-isoquinolinyl]-2-butenedioates through the reaction of isoquinoline and dimethyl acetylenedicarboxylate in the presence of amides" *Tetrahedron Letters*, 2007, 48, 3749-3751.
49. Yavari, I.; Hossaini, Z.; Sabbaghan, M. "Reaction of N-heterocycles with activated acetylenes in the presence of N-alkylisatins or ninhydrin. A synthesis of spiro compounds" *Chemical Monthly*, 2007, 138, 677-681.
50. Yavari, I.; Sabbaghan, M.; Hossaini, Z. "Reaction between alkyl isocyanides and isopropylidene Meldrum's acid in the presence of bidentate nucleophiles" *Molecular diversity*, 2007, 11, 1-5.
51. Yavari, I.; Hossaini, Z.; Sabbaghan, M. "Synthesis and Dynamic NMR Study of Functionalized 1-(3-Furyl)-1H-indole-2,3- diones, *Chemical Monthly*, 2007, 138, 107-110.
52. Yavari, I.; Sabbaghan M., "A synthesis of functionalized pyrroles by reaction of 3,4-diacetyl hexane-2,5-dione with primary amines in water". *Synthetic communication*, 2007, 37, 1791-1800.
53. Yavari, I.; Sabbaghan, M.; Hossaini, Z.; "Reaction of Hexachloroacetone with Activated Acetylenes in the Presence of N-Heterocycles. Synthesis of Trichloromethylated Bridgehead N-Heterocycles" *Synlett*, 2006, 15, 2501-2503.
54. Yavari, I.; Hossaini, Z.; Sabbaghan, M., "Three-Component Synthesis of pyrrolo[2,1-a]isoquinolines, 9-pyrrolo[1,2-a]quinoline and indolizine" *Tetrahedron Letters*, 2006, 47, 6037-6040.
55. Yavari, I.; Hossaini, Z.; Sabbaghan M. "Synthesis of functionalized 5-imino-2,5-dihydro-furans through the reaction of isocyanides with activated acetylenes in the presence of ethyl bromopyruvate" *Molecular diversity*, 2006, 10, 479-482.

## Publication in persian

۵۶. تاثیر آموزش به کمک بازی رایانه ای دالان سبز در افزایش یادآوری مفاهیم شیمی اول دبیرستان، فرمند فرزین، مریم صباغان، فن آوری اطلاعات و ارتباطات در علوم تربیتی، ۱۳۹۴، ۳: ۱۳۹-۱۵۵.
۵۷. ارائه راهکارهای مناسب برای ورود آموزش شیمی سبز به برنامه درسی شیمی دوره متوسطه با استفاده از تجارب کشورهای پیشرفته، لیلا حبیبی، مریم صباغان، سید محمدرضا امام جمعه، نوآوریهای آموزشی، ۱۳۹۲، ۴۸: ۷۱-۹۲.
۵۸. آموزش شیمی سبز، با طراحی و اجرای آزمایشهای سبز در مبحث استوکیومتری شیمی متوسطه، مریم صباغان، جهان شاهی بیگباغی و محمدرضا امام جمعه، نوآوری های آموزشی، ۱۳۹۵، ۱۱: ۲۱-۳۴.
۵۹. مطالعه تطبیقی آموزش شیمی سبز در برنامه درسی مدارس متوسطه ایران و چهار کشور پیشرفته، لیلا حبیبی، مریم صباغان، سید محمدرضا امام جمعه، نوآوری های آموزشی، ۱۳۹۶، ۶۱: ۶۷-۹۰.
۶۰. طراحی محتوای آموزش سنجش های شیمی سبز برای دانشجویان کارشناسی شیمی: سنجش های جرمی و زیست محیطی، مریم قنبری، مریم صباغان، معصومه قلخانی، فاطمه خالوندی، ۱۳۹۷

## کتاب:

### BOOKS

- **Sabbaghan M.**, Goodarzi M., "Chemistry In The National Science Education Standard" (Translated to Persian), Shahid Rajaei Teacher Training University, Tehran, 2013.
- **Sabbaghan M.**, Marashi P., Montazeri F., "Without Inorganic Sources, Never" (Persian), Mehrab ghalam, Tehran, 2002.
- **Sabbaghan M.**, Mahmudian M, "Atomic Structure" (Persian) , Mehrab ghalam, Tehran 2003.

## جوایز

### AWARDS

۱. برنده جایزه بهترین نویسنده کتاب با عنوان: ساختار اتم، در جشنواره ملی رشد در سال ۱۳۸۳.
۲. برنده جایزه پایان نامه برتر دانشگاه تربیت دبیر شهید رجایی در سال ۱۳۹۱.
۳. برنده جایزه کتاب برتر دانشگاه تربیت دبیر شهید رجایی در سال ۱۳۹۳.
۴. برنده جایزه پژوهشگر برتر دانشگاه تربیت دبیر شهید رجایی در سال ۱۳۹۴.

## SELECTED INTERNATIONAL CONFERENCES

---

- "Reaction between alkyl isocyanides and isopropylidene Meldrum's acid in the presence of bidentate nucleophiles" Presented at the 4th Eurasian Meeting On Heterocyclic chemistry (bioactive heterocycles) In Thethesaloniki, Greek, In August of 2006 as a Poster.
- "Synthesis of functionalized 5-imino-2,5-dihydro-furans through the reaction of isocyanides with activated acetylenes in the presence of ethyl bromopyruvate" Presented at the 4th Eurasian Meeting On Heterocyclic chemistry (bioactive heterocycles) In Thethesaloniki, Greek in August of 2006 as a Poster.
- "Reaction between alkyl isocyanides and isopropylidene Meldrum's acid in the presence of bidentate nucleophiles" Presented at 13th Iranian Seminar of Organic Chemistry 7-9 September 2006, in Faculty of Chemistry, Bu-Ali Sina University, Hamadan, Iran as a Poster.
- "A Novel One-Pot Synthesis of Substituted Quinolines" Presented at the Tenth tetrahedron symposium in Paris, France In June of 2009 as a Poster.
- "Synthesis of 2,3,4-trisubstituted Furans using DABCO-Catalyzed Reaction" Presented at the Twelfth Tetrahedron Symposium 21-24 June 2011, Sitges, Spain, as a Poster.
- "A rapid four-component synthesis of functionalized thiazoles in water" Presented at the Twelfth Tetrahedron Symposium 21-24 June 2011, Sitges, Spain, as a Poster.
- "Solvent-free One pot synthesis of N-alkyl 2-[(2-oxo-2-aryl ethyl)amino] benzamide derivatives using isatoic anhydride" Presented at the Twelfth Tetrahedron Symposium 21-24 June 2011, Sitges, Spain, as a Poster.
- "The Effect of Template on Morphology and Optical Properties of ZnO Nanostructures" Presented at the 3rd International Conference on Ultrafine Grained and Nanostructured Material Center of Excellence For High Performance Materials School of Metallurgy and Materials Engineering University College of Engineering, University of Tehran, Tehran, Iran in 2-3 November 2011 as a lecture.
- "Preparation of Different ZnO Nanostructures with the Same Ionic Liquid" 2<sup>nd</sup> International Conference on presented at the "Nanomaterials: Fundamental and application" in 25-27 November 2015.
- "Ionic liquids Assisted Synthesis of Single-phase Maghemite ( $\gamma$ -Fe<sub>2</sub>O<sub>3</sub>) Nanostructures" 2<sup>nd</sup> International Conference on presented at the "Nanomaterials: Fundamental and application" in 25-27 November 2015.

## PROFESSIONAL EXPERIENCE

---

- داور و مسئول گروه نانوتکنولوژی جشنواره جوان خوارزمی به مدت ۸ سال
- رئیس اداره پایان نامه ها در دانشگاه شهید رجایی
- مسئول بخش ارزشیابی گروه شیمی دفتر برنامه ریزی و تالیف کتب درسی ۴ سال
- مشاور در تالیف کتاب درسی در گروه شیمی دفتر برنامه ریزی و تالیف کتب درسی ۱ سال
- همکار و نویسنده در مجله رشد آموزش شیمی

## زمینه های مورد علاقه

### INTERESTS

---

#### ▪ Organic Chemistry

Using multicomponent and other organic reactions, for chemical syntheses of organic molecules with potential biological.

#### ▪ Nanotechnology

Synthesis nanostructures of Metal oxides in ionic liquids as template and study optical properties.

Synthesis of micro/mesoporous material template by CTAB and ionic liquids.

Catalysis: using nanoparticles, nanocomposites or MCM-41 for improving organic reactions conditions and yields and also preparing green and environmental friendly catalysis. composites of NFC and NFC grafting.

#### ▪ Education in chemistry

Education in green chemistry

Education in concept maps