应用胶体与界面化学

团队负责人：刘雪锋 教授/博导

团队成员：张永民 副教授/硕导，樊晔 副教授/硕导

一、研究领域 / Research Fields

1. 应用胶体与界面化学
2. 新型表面活性剂分子设计、合成、智能组装及应用研究
3. 新型化妆品及功效成分的制备、包载
4. 油田化学

二、研究内容 / Research Contents

1. 绿色油脂基表面活性剂的合成与工业化
2. 特殊功能型表面活性剂的设计与合成
3. 环境刺激响应型胶体体系的构筑与调控
4. 天然不饱和脂肪酸组装体及其在化妆品功能组分递送中的应用
5. 天然聚合物的改性及其在环境修复中的胶体与界面化学
6. 水凝胶的自调控及其在油田封堵、调剂、压裂中的应用
7. 化妆品功效成分的软性界面递送技术

三、代表性成果 / Representative Achievements

1. 项目

1）国家重点研发计划课题“高效高值表面活性剂的研究开发及应用示范”（2017YFB0305000）
2）国家重点研发计划课题“脂肪酸囊泡的囊材生产技术开发”（2017YFB0308705）
3）国家自然科学基金：可逆调控Krafft温度自SESW后胶束溶液同步回收表面活性剂和增溶物的构效关系（22272062）
4）国家自然科学基金面上项目：多重刺激响应型无表面活性剂离子液微乳的构筑、智能调控及应用（22072058）
5）国家自然科学基金：智能开关微乳及其清洗/回收矿物油的构效关系（21673103）
6）国家自然科学基金：非球状纳米结构阵列型SERS基底及其构效关系研究
7）国家自然科学基金青年基金项目：基于刺激响应性脂肪酸囊泡的新型Pickering乳液的研究（21606107）
8）国家自然科学基金青年基金项目：基于含硒功能分子的氧化—还原开关型蠕虫状胶束的构筑及性能研究（21503094）
9）江苏省自然科学基金项目：氧化—还原响应型含硒双子表面活性剂的合成及自组装研究（BK20150128）
10）江苏省教育厅：特种表面活性剂分子设计与制造

2. 获奖

1）中国轻工业联合会科技发明二等奖（2022）
2）中国轻工业联合会科技进步三等奖（2017）
3）江苏省科学技术三等奖（2011）
4）江苏省高等学校重点教材（2021）
5）荣智权奖教金获得者（2014, 刘雪锋）
6）江南大学教学成果二等奖（2017）
7）全国大学生化学实验创新设计大赛一等奖指导教师（2022，樊晔/张永民）
8）江南大学本科优秀毕业设计(论文)指导教师（2017/2019）
9）江南大学青年教师教学会讲三等奖（2016/2018）

3. 专利

1）一种油基钻屑清洗和基础油回收方法ZL201410705872. 8
2）一种含硒表面活性剂及其制备方法和应用ZL201510915772. 2
3）一种无泡型硅支化脂肪酸离子液体表面活性剂及其制备方法. ZL202111372220. 3.
4）一种活性氧响应型囊泡及其制备方法. ZL202010363474 8.
5）一种包含5-氟尿嘧啶的层层自组装纳米载体及制备方法，ZL 2018115679564
6）一种脂肪酸基VC脂质体的制备方法，ZL 202010497171 5
7）一种N, N-二烷基-N-脂肪醇聚氧乙烯醚基叔胺的制备方法ZL 201010574368. 0
8）一种自增稠表面活性剂及其制备方法. ZL202010465452. 2.
9）一种二茂铁杂化的壳聚糖基气凝胶的制备方法和产品及其应用，ZL2022102033324
10）一种铜网基叶片状金SERS活性基底的制备方法ZL201310681981. 6

4. 论文

1)Jiajie Pan, Lianlian Sun, Xuefeng Liu*, Yinjun Fang. Precipitation-Dissolution Switchable Surfactants with the Potential of Simultaneous Retrieving of Surfactants and Hydrophobic Organic Contaminants from Emulsified and Micellar Eluents. Chem. Eng. J., 2023, 458, 141297
2)Shanjuan Zhao, Huan Xie, Xutao Tang, Guoqiang Lu, Yongmin Zhang*. Oxidizeddextran-crosslinked ferrocene-chitosan-PEI composite porous material integrating adsorption and degradation tomalachite green. Carbohyd. Polym., 2023,312,122770
3)Yongmin Zhang,* Meng Mu, Yue Zhou, Huan Xie, Shanjuan Zhao. Redox-responsive microemulsion: Fabrication and application to curcumin encapsulation. J. Colloid Interface Sci., 2023, 647, 384-394
4)Ruiqin Feng, Miaomiao Chen, Yun Fang*, Ye Fan and Yongmei Xia*, Supramolecular interactions in the pseudo-polyanions of polyvinylpyrrolidone complexed with various anionic surfactants, Colloids Surfaces A: Physicochem. Eng. Aspects, 2023, 671,131585
5)Ruiqin Feng, Ye Fan, Yun Fang* and Yongmei Xia*, Morphological effects of Au nanoparticles on electrochemical sensing platforms for nitrite detection, Molecules, 2023, 28, 4934
6)Yongmin Zhang*, Shanjuan Zhao, Meng Mu, Lushan Wang, Ye Fan and Xuefeng Liu, Eco-friendly ferrocene-functionalized chitosan aerogel for efficiently degrading dye and adsorbing phosphate from wastewater, Chem. Eng. J., 2022, 439, 135605
7)樊晔, 曹崇梅, 方云*, 夏咏梅. 自交联共轭亚油酸囊泡基荧光纳米点的构筑及其荧光特性. 物理化学学报, 2022, 38(3): 2002032
8)Huan Li, Xuefeng Liu*. Rational design of dynamic imine surfactants for oil-water emulsions: Learning from oil-induced reversible dynamic imine bond formation. J. Colloid Interface Sci., 2022, 607, 163-170
9)Yongmin Zhang*, Meng Mu, Zhe Yang, Xiaochen Liu. Ultralong-Chain Ionic Liquid Surfactants Derived from Natural Erucic Acid, ACS Sustainable Chem. Eng., 2022, 10(7), 2545-2555
10)Hong Wang, Xinyu Zhang, Yun Fang*, Ye Fan, Ei San Khin Nyein. Smart and recyclable admicelle-coated Fe3O4 nanoparticles for treating oily wastewate. J. Environmental Chem. Eng., 2022, 10, 107445
11)Lei Li, Yun Fang*, Yongmei Xia, Chunling Bo, Ye Fan. Monosaccharides driving the formation of conjugated linoleic acid vesicles in near-neutral solutions via weak noncovalent bonding interactions. J. Mol. Liq., 2022, 351, 118656
12)Shuyu Wang, Shuang Cai, Xuefeng Liu*, Yongmin Zhang, Yun Fang. Reversible CO2/N2-tuning Krafft temperature of sodium alkyl sulphonates and a proof-of-concept usage in surfactant-enhanced soil washing. Chem. Eng. J., 2021, 417, 129316
13)Zhe Yang,Shuai He, Yinjun Fang,Yongmin Zhang*. Viscoelastic fluid formed by ultra-long-chain erucic acid-base ionic liquid surfactant responds to acid/alkaline, CO2 and light. J. Agric. Food Chem., 2021, 69(10), 3094-3102.
14)Yue Zhou, Shuai He, Huanhuan Li, Yongmin Zhang*. CO2 and temperature control over nano-aggregate in surfactant-free microemulsion. Langmuir, 2021, 37(5), 1983-1990.
15)Yongmin Zhang, Yujun Feng*. Stimuli-responsive microemulsions: State-of-the-art and future prospects. Curr. Opin. Colloid Interface Sci., 2020, 49, 27–41.
16)Ye Fan, Shuang Cai, Dekun Xu, Qin Sun, Xuefeng Liu*, Yongmin Zhang, Yinjun Fang. Reversible-tuning Krafft temperature of Selenium-containing ionic surfactants by redox chemistry. Langmuir, 2020, 36(13): 3514-3521
17)Yanjie Xu, Yuandi Zhang, Xuefeng Liu*, Hui Chen, Yun Fang. Retrieving oil and recycling surfactant in surfactant-enhanced soil washing. ACS Sustainable Chem. Eng., 2018, 6, 4981−4986
18)Yongmin Zhang, Fei Qin, Xuefeng Liu*, Yun Fang. Switching worm-based viscoelastic fluid by pH and redox. J. Colloid Interface Sci., 2018, 514, 554–564
19)Ye Fan, Jie Ma, Yun Fang*, Tingting Liu, Xueyi Hu, Yongmei Xia. Neutral and acid-adapted fatty acid vesicles of conjugated linoleic acid. Colloids Surfaces B: Biointerfaces, 2018, 167: 385-391
20)Yongmin Zhang, Yuandi Zhang, Cheng Wang, Xuefeng Liu*, Yun Fang, Yujun Feng. CO2-responsive microemulsion: reversible switching from an apparent single phase to near-complete phase separation. Green Chem., 2016, 18, 392-396
21)Yongmin Zhang, Chengcheng Yang, Shuang Guo, Hui Chen, Xuefeng Liu*. Tandem triggering of wormlike micelles using CO2and redox. Chem. Commun., 2016, 52, 12717-12720
22)Yongmin Zhang, Yujun Feng*. CO2-induced smart viscoelastic fluids based on the mixture of sodium erucate and triethylamine. J. Colloid Interface Sci.,2015, 447, 173–181.
23)Ye Fan, Yun Fang*, Lin Ma. The self-crosslinked ufasome of conjugated linoleic acid: investigation of morphology, bilayer membrane and stability. Colloids Surfaces B: Biointerfaces, 2014, 123: 8-14
24)Ye Fan, Yueping Ren, Mengjie Wu, Yun Fang*. Self-seeding synthesis of silver nanosheets with binary reduction in poly(vinylpyrrolidone) - sodium dodecyl sulfate aggragation microreactor. Micro & Nano Letters, 2014, 9(10): 726-730