**浙江省科学技术奖公示信息表（单位提名）**

提名奖项：自然科学奖

|  |  |
| --- | --- |
| **成果名称** | 形状记忆高分子的网络结构设计及变形机理研究 |
| **提名等级** | 一等奖 |
| 提名书  相关内容 | 代表性论文目录：   1. Zhao Qian; Zou Weike; Luo Yingwu; Xie Tao\*; Shape memory polymer network with thermally distinct elasticity and plasticity, Science Advances, 2016, 2(1): e1501297. 2. Zheng Ning; Fang Zizheng; Zou Weike; Zhao Qian\*; Xie Tao\*; Thermoset shape-memory polyurethane with intrinsic plasticity enabled by transcarbamoylation, Angewandte Chemie-International Edition, 2016, 55(38): 11421-11425. 3. Miao Wusha; Zou Weike; Jin Binjie; Ni Chujun; Zheng Ning; Zhao Qian; Xie Tao; On demand shape memory polymer via light regulated topological defects in a dynamic covalent network, Nature Communications, 2020, 11: 4257. 4. Huang Limei; Jiang Ruiqi; Wu Jingjun; Song Jizhou; Bai Hao; Li Bogeng; Zhao Qian\*; Xie Tao\*; Ultrafast digital printing toward 4D shape changing materials, Advanced Materials, 2017, 29(7): 1605390. 5. Zhang Guogao; Peng Wenjun; Wu Jingjun; Zhao Qian; Xie Tao\*; Digital coding of mechanical stress in a dynamic covalent shape memory polymer network, Nature Communications, 2018, 9: 4002. 6. Ma Chunxin; Li Tiefeng; Zhao Qian \*; Yang Xuxu; Wu Jingjun; Luo Yingwu; Xie Tao; Supramolecular Lego assembly towards three-dimensional multi-responsive hydrogels, Advanced Materials, 2014, 26(32): 5665-5669. 7. Jin Binjie; Song Huijie; Jiang Ruiqi; Song Jizhou; Zhao Qian\*; Xie Tao\*; Programming a crystalline shape memory polymer network with thermo- and photo-reversible bonds toward a single-component soft robot, Science Advances, 2018, 4(1): eaao3865. 8. Zhao Qian; Qi H. Jerry; Xie Tao \*; Recent progress in shape memory polymer: new behavior, enabling materials, and mechanistic understanding, Progress in Polymer Science, 2015, 49-50: 79-120.   主要知识产权目录：   1. Xie Tao; Wu Jingjun; Zhao Qian; Zou Weike; Fabrication and application of shape memory polymer possessing transesterification induced permanent reshaping property，2019-10-22，美国专利，US 10449709B2. 2. Xie Tao; Wu Jingjun; Zhao Qian; Fang Zizheng; Method for preparing 3D polymer objects with surface microstructures，2020-02-04，美国专利，US 10549475B2. 3. Xie Tao; Wu Jingjun; Zhao Qian; Huang Limei; Method for fast building three-dimension polymer structures based on digital light patterning，2019-03-26，美国专利，US 10239238B2. 4. 谢涛；吴晶军；赵骞；邹玮珂；基于酯交换的可塑性形状记忆聚合物的应用方法，2017-01-04，中国专利，ZL201510436041.X. 5. 谢涛；张军瑞；赵骞；具有双向可逆形状记忆效应的聚合物及其制备方法，2017-04-12，中国专利，ZL201510016304.1. |
| 主要完成人 | 谢涛，排名1，教授，浙江大学；  赵骞，排名2，教授，浙江大学；  郑宁，排名3，研究员，浙江大学；  吴晶军，排名4，副研究员，浙大宁波理工学院； |
| 主要完成单位 | 1.单位名称：浙江大学 |
| **提名单位** | 浙江大学 |
| **提名意见** | 形状可编程材料被美国国防部高等研究局（DARPA）列为未来的前沿材料，由此发展的感知外部刺激而执行相应功能的形状记忆高分子在生物医学、航空航天、以及智能制造等领域表现出瞩目的应用前景。虽然形状记忆高分子发展了半个多世纪，但是其原始形状的构筑与调控方法基本处于空白。该项目在国际上率先开创了外力编程调控原始形状的全新途径，建立了超快速4D打印及全固态4D打印的新机制，开拓了多模态软体机器人设计的新路径。  在理论与应用方面都有突破性进展，引起国际广泛关注，推动了智能响应高分子方向的发展，并实现了航空应用。特提名该项目为浙江省自然科学奖一等奖。 |