

Advancing Biomedicine Through Functional Hybrids: From Nanoparticle-Based Therapeutics to 3D-Printed Soft Robots

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Metal based inorganic nanoparticles have received great attention owing to their potential applications in biomedical field. Engineering of inorganic nanoparticles with polymer coatings lead to the reaction of polymer/inorganic nanohybrids with improved biocompatibility and functionality. The current talk focuses on the engineering of various type of inorganic nanoparticles using polymers synthesised through reversible addition-fragmentation chain transfer (RAFT) polymerisation method,¹ with a specific focus on magnetic nanoparticles² and liquid metal nanoparticles. These advanced polymer-coated inorganic nanoparticles can be used as imaging probes for disease diagnosis and gene delivery agents for therapeutic purposes, benefitting from the versatile designs of RAFT polymers. Additionally, I will discuss our recent research on 3D-printed liquid metal polymer composites, showcasing their applications as near-infrared (NIR)-responsive 4D printing soft robots.⁵

References:

¹ X. Huang, R. Qiao*, T. P. Davis*, *Biomacromolecules* **2019**, 20, 12, 4243

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³ Xin F., .. Qiao R.*, *Chem. Mater.* **2020**, 32, 3, 1080

⁴ H. Forgham, ... R. Qiao*, *Adv. Sci.*, **2024**, 2401340

⁵ L. Zhang, ..R. Qiao*, *Nat Commun* 14, 7815 (2023)