Design and synthesis of novel self-assembled electro-conductive network

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Project description

Conductive hydrogels (CHs) are emerging as a promising and well-utilized platform for 3D cell culture and tissue engineering to incorporate electron signals as biorelevant physical cues. In conventional covalently crosslinked conductive hydrogels, the network dynamics (e.g., stress relaxation, shear shining, and self-healing) required for complex cellular functions and many biomedical utilities (e.g., injection) cannot be easily realized. In contrast, dynamic conductive hydrogels (DCHs) are fabricated by dynamic and reversible crosslinks. By allowing for the breaking and reforming of the reversible linkages, DCHs can provide dynamic environments for cellular functions while maintaining matrix integrity. These novel materials can mimic some properties of native tissues, making them well-suited for several biotechnological and medical applications.

In this project, we aim to design novel electro-conductive network using self-assembling chemistry. The resulting polymer matrices are expected to exhibit enhanced electro-conductivity and capacity, as well as resembling various biochemical and mechanical features of living tissues. The resulting materials will be applied to develop advanced cell culture, in vitro disease models, as well as novel therapies.