

Abstract Submitted
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The Role of Hydroxide and Metal Concentration on the Viscoelastic Properties of Metal Coordinated Gels¹ SETH CAZZELL, NIELS HOLTEN-ANDERSEN, Massachusetts Institute of Technology — Nature uses metal binding amino acids to engineer mechanical properties. An example of this engineering can be found in the mussel byssal thread. This acellular thread contains reversible intermolecular protein-metal bonds, which allows the mussel to robustly anchor to rocks, while withstanding the mechanically demanding intertidal environment. Inspired by this metal-binding material, we present a synthetic hydrogel designed to mimic this bonding behavior. The mechanical properties of this hydrogel can be controlled independently by manipulating the amount of metal relative to the metal binding ligand, and the gel's pH. Here we report how high metal to ligand ratios and low pH can be used to induce the formation of a strong, slow relaxing gels. This gel has potential applications as an energy dissipating material, and furthers our understanding of the bio-inspired engineering techniques that are used to design viscoelastic soft materials.

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