

## **BIO-INSPIRED METAL-COORDINATION: USING MORE OF NATURE'S TRICKS TO ASSEMBLE HYDROGEL MATERIALS WITH MULTI-FUNCTIONAL PROPERTIES**

Niels Holten-Andersen, Massachusetts Institute of Technology  
holten@mit.edu

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A variety of dynamic bonds have been employed as reversible crosslinks in polymer materials in efforts to obtain desirable properties such as stimuli-response, self-healing and shape-memory. Many dynamic bonds utilized so far however, have poor compatibility with aqueous solvents, thereby limiting their use in polymer materials intended for environmental, medical and personal care applications. Inspired by marine biological materials, we have been exploring metal-coordinate dynamic crosslinks that allow unique control over metal-binding polymer network properties in aqueous conditions. These early bio-mimetic explorations revealed that certain metal-ligand coordination complexes allow aqueous polymer solutions to be finely tuned between fluids and strong viscoelastic gels, simply by the choice of the coordinating metal ion. More recently we have begun exploring stimuli-responsive properties of metal-coordinate polymer networks and have found that temperature, pH, magnetic and mechanical stimuli all can induce strong responses in metal-ligand coordinate crosslink dynamics. These demonstrations open the door to design of multi-stimuli-response controlled polymer hydrogel materials. Early lessons from this pursuit will be presented.