

Tuneable Bio-Inspired Double Network Hydrogels

Alvaro Charlet¹

¹ Soft Materials Laboratory, Institute of Materials, École Polytechnique Fédérale de Lausanne (EPFL), 1015 Lausanne, Switzerland

Hydrogels with well-controlled and engineered properties are often used in biomedicine, for example for wound healing, or tissue engineering. For example, hydrogels with a very high toughness, that are well-suited soft dampers, can be fabricated by combining covalent and non-covalent bonds. However, these hydrogels are typically elastic such that they cannot be used for load-bearing applications. By contrast, nature can produce hydrogels with fine-tuned mechanical responses, that are tough and yet sufficiently strong, that they can bear load. Inspired by the marine mussel, we investigate the influence of hydrogel networks, using well-defined polymers with covalent and tuneable transient bonds, on their mechanical properties.