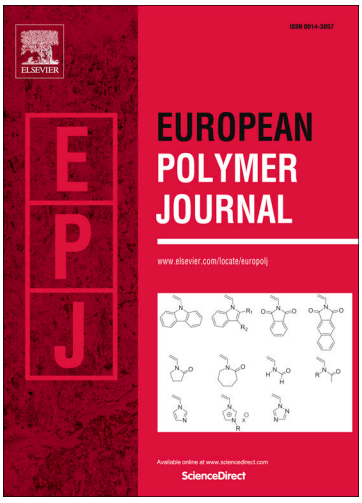

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Hydroxyethyl Cellulose-Based Self-Healing Hydrogels with Enhanced Mechanical Properties *via* Metal-Ligand Bond Interactions

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1. We present the synthesis of hydroxyethyl cellulose based hydrogel with enhanced self-healing and mechanical properties.
2. The engineered hydrogel shows high tensile strength (1.35 MPa), extensive fracture strain (1660%), high toughness (8.8 MJm^{-3}) and a compression stress of 28 MPa.
3. The designed hydrogel also exhibits outstanding self-healing efficiency (87%) without any external intervention at room temperature.

Abstract

Self-healing hydrogels with robust mechanical properties is the primary objective of hydrogel materials. In this work, we report the synthesis of iron (III) containing hydroxyethyl cellulose based hydrogel (**HEC/PAA-Fe^{3+}**) through dynamic metal-ligand (M-L) interactions with enhanced self-healing and mechanical properties. The decoration of ferric ions (Fe^{3+}) in a physically cross-linked polymer network (HEC/PAA) introduces dynamic energy dissipative