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Sodium Alginate/Carboxyl-functionalized Graphene Composite Hydrogel via Neodymium Ions Coordination

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ABSTRACT

A facile method for the preparation of sodium alginate (SA)/carboxyl-functionalized graphene (G-COOH) composite hydrogel was developed. Based on the coordination ability of lanthanide ions to the carboxyl groups, a series of hydrogel derived from different ratios of SA and G-COOH were fabricated by neodymium (Nd^{3+}) ions coordination. A relatively uniform layered structure was recorded by SEM at the interior of SA/G-COOH hydrogel. Several parameters such as water content, swelling ratio (SR), tensile test and solvent resistance were also investigated. The SA/G-COOH composite hydrogel showed excellent mechanical strength, and the tensile strength of SA/G-COOH composite hydrogel reaches 53.72 MPa at high water content. Due to the coordination ability of Nd^{3+} ions, the hydrogel also exhibited an excellent solvent resistance and stability.

KEYWORDS: Carboxyl-functionalized graphene, Sodium alginate, Hydrogel, Neodymium ions coordination, Layered structure.

1. Introduction