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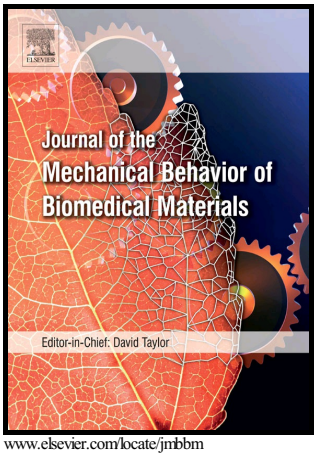


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# Effects of precursor composition and mode of crosslinking on mechanical properties of graphene oxide reinforced composite hydrogels

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**Abstract**

Graphene oxide (GO) is increasingly investigated as a reinforcing nanofiller for various hydrogels for biomedical applications for its superior mechanical strength. However, the reinforcing mechanism of GO in different hydrogel conditions has not been extensively explored and elucidated to date. Herein, we systematically examine the effects of various types of precursor molecules (monomers vs. macromers) as well as mode of GO incorporation (physical vs. covalent) on the mechanical properties of resulting composite hydrogels. Two hydrogel types, (1) polyacrylamide hydrogels with varying concentrations of acrylamide monomers and (2) poly(ethylene glycol) (PEG) hydrogels with varying molecular weights of PEG macromers, are used as model systems. In addition, incorporation of GO is also controlled by using either unmodified GO or methacrylic GO (MGO) which allows for covalent incorporation. The results in this study demonstrate that the