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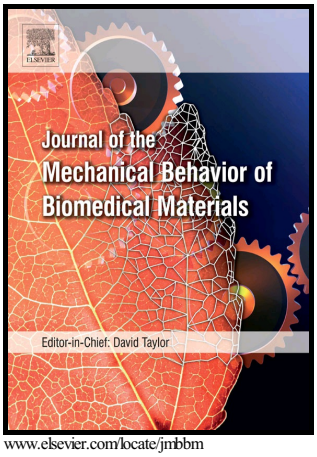

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Photopolymerization Kinetics of Methyl Methacrylate with Reactive and Inert Nanogels

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The enhanced *in situ* photopolymerization kinetics of methyl methacrylate (MMA) to poly(methyl methacrylate) (PMMA) through the incorporation of both inert and reactive nanogel (NG) fillers under ambient conditions has been demonstrated. In addition to the polymerization kinetics, the physical and chemical properties of the prepolymeric NG were also utilized to tune the thermoplasticity and mechanical properties of the PMMA polymer network. The protocol followed in this study imparts superior MMA photopolymerization kinetics (≥ 60% double-bond conversion within 15 minutes for > 35 wt% nanogel loadings and ≥ 95% double-bond conversion in < 60 minutes for all nanogel concentrations) when compared with traditional polymerization mechanisms. PMMA remained a glassy material following the incorporation of both inert and reactive NG as demonstrated by the glass transition temperature (T_g) of the ultimate networks. Network linearity is uncompromised following incorporation of inert nanogel additives, thereby preserving the thermoplasticity of the PMMA network. As the non-functionalized, inert NG