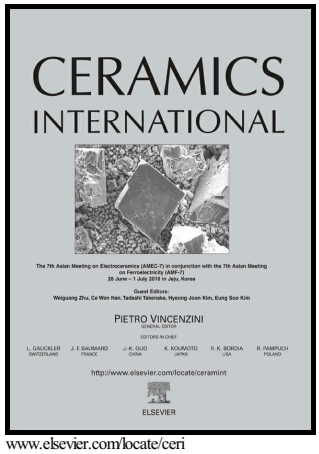

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Abstract

In this study, we have attempted to prepare reduced graphene nanosheets (RGNS) reinforced nano-hydroxyapatite (nHAp) nanocomposites *via* different sonochemical treatments of nHAp. Structural properties of RGNS-nHAp nanocomposites were investigated by XRD and Raman analysis. *In vitro* bioactivity of RGNS-nHAp nanocomposites were examined by immersing them in hank's balanced salt solution and further *in vitro* apatite layer formation was confirmed by systematic investigations using FESEM and ICP-OES analyses. Interactions of RGNS, pure nHAp and their nanocomposites with human erythrocytes were explored. Hemocompatibility of BGO-nHAp nanocomposites were found to be superior to pristine RGNS. The nanocomposites were mechanically improved when compared to nHAp through effective load transfer onto their 2D lattice of RGNS. However, 20PGO-nHAp nanocomposites were mechanically weaker than 20BGO-nHAp due to the formation of β-TCP as an additional phase, thus decreases its mechanical strength.