Supplementary Information for

Strontium Eluting Graphene Hybrid Nanoparticles

Augment Osteogenesis in 3D Tissue Scaffold

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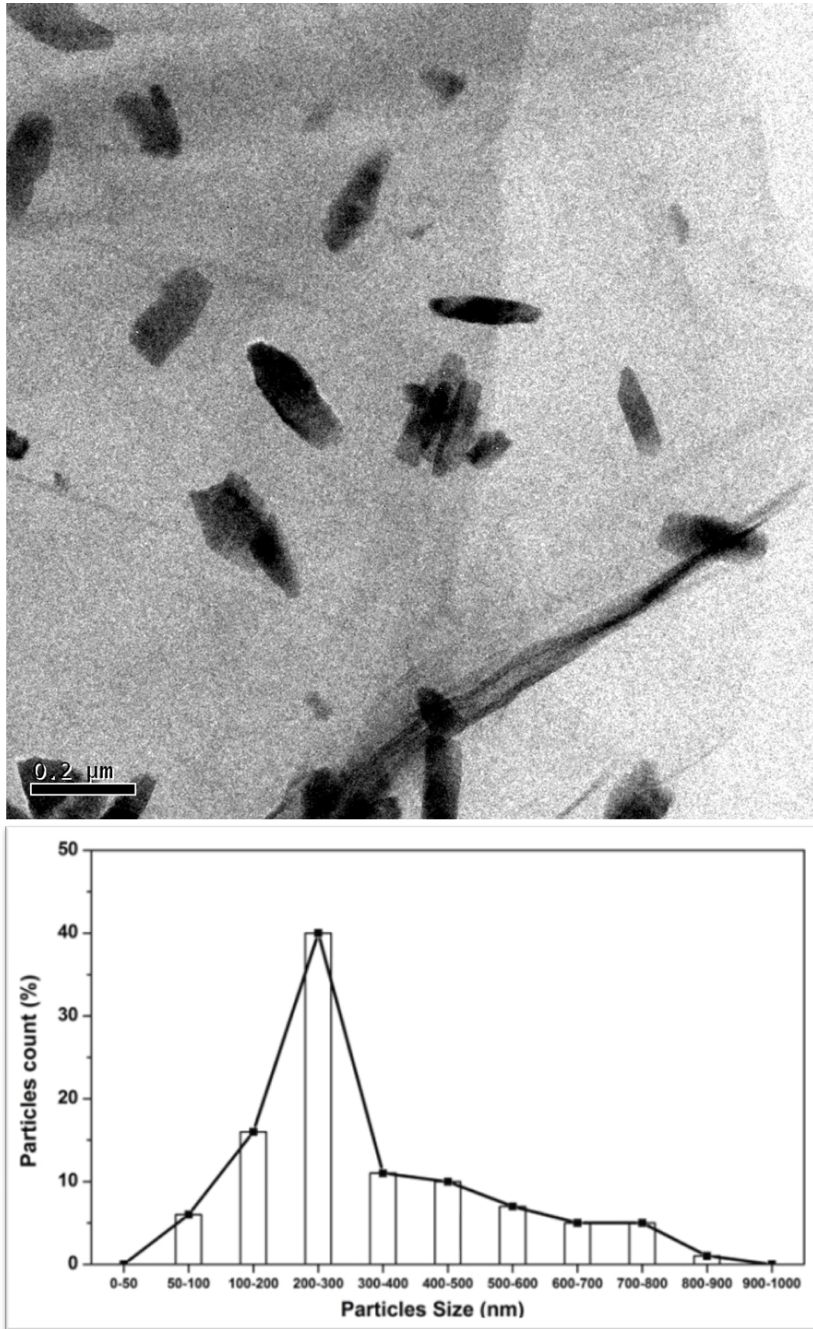Email: kchatterjee@materials.iisc.ernet.in

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Figure S1: (top) TEM micrograph of RGO_Sr flake with strontium particle size distribution on RGO surface The size (length) of about 100 strontium particles on RGO surface was measured directly from the TEM images. (bottom) Histogram presenting ize distribution of Sr particles on RGO surface. More than 60 % of metallic strontium particles on RGO surface were less than 300 nm in size. Among them, around 65 % of Sr particles were in the range of 200-300 nm. These results indicated the formation of Sr nanoparticles on RGO surface with low polydispersity of Sr particles.
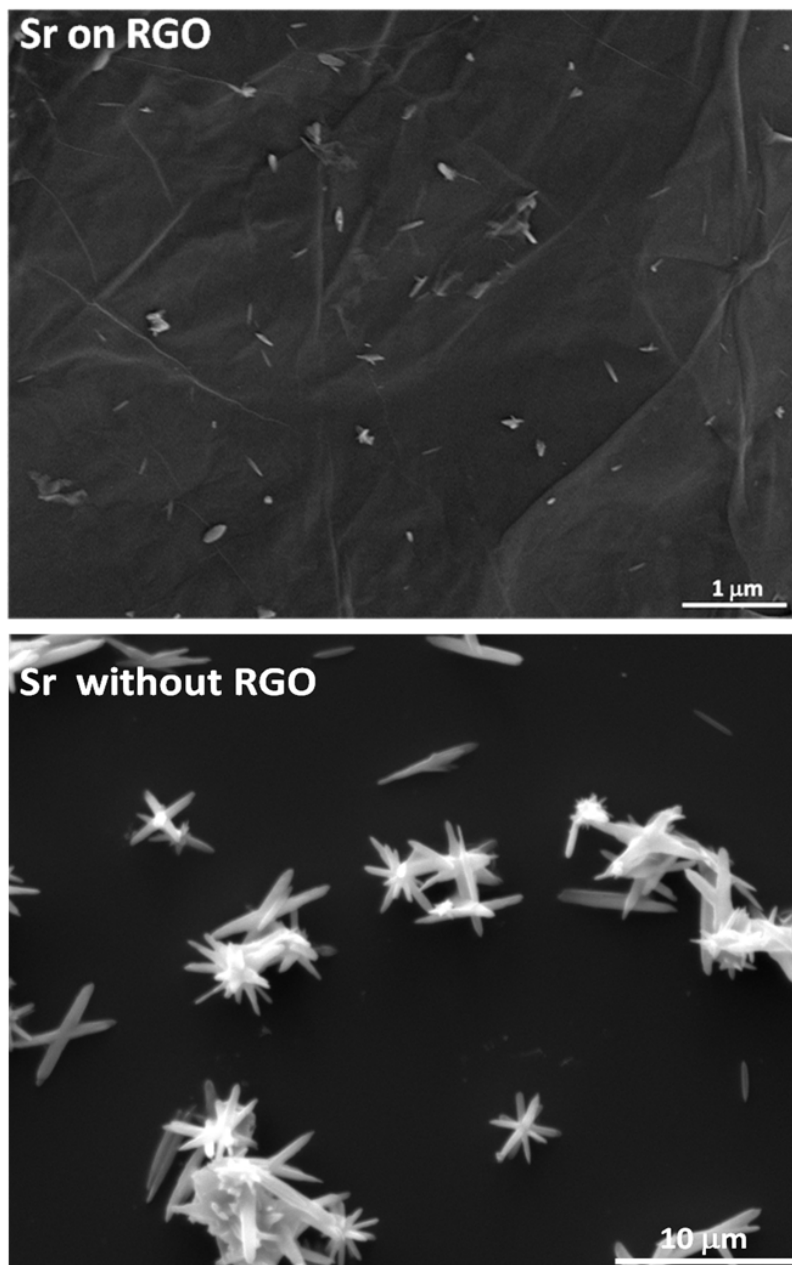
Figure S2: SEM micrographs of (top) Sr metallic nanoparticles on RGO in the RGO_Sr hybrid particles; and (bottom) Sr metallic particles without graphene synthesized under similar conditions. Note the difference in scale bars and thus the size of the particles. Particles are smaller and well dispersed in RGO_Sr but tend to aggregate into microparticles in the absence of RGO.
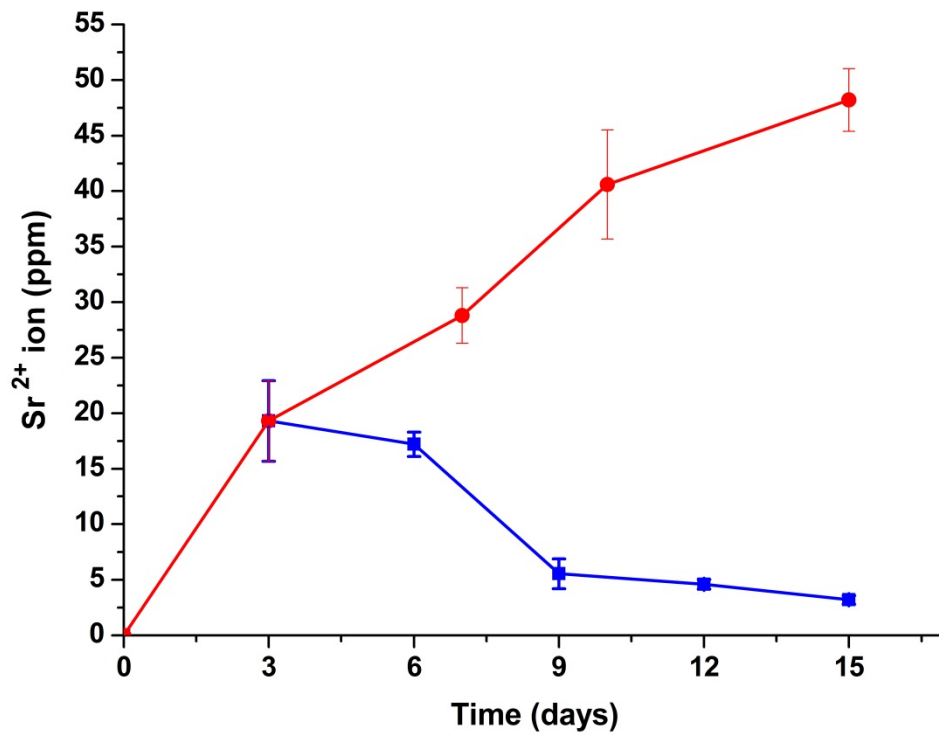
Figure S3: Release kinetics of strontium ions from PCL/RGO_Sr_5 scaffolds wherein water was either replenished every 3 days (blue) or cumulative ion release was measured (red).
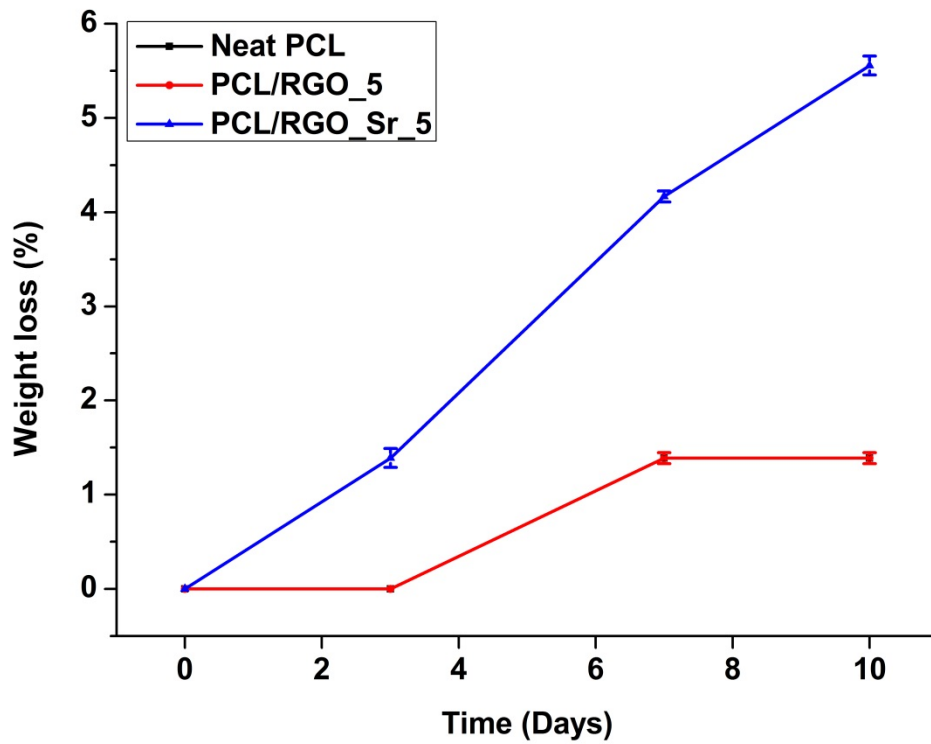
Figure S4: Hydrolytic degradation of polymer films represented by the weight loss curve for neat PCL, PCL/RGO_5 and PCL/RGO_Sr_5 cast films. Note the overlap of the plots for PCL and PCL/RGO_5.
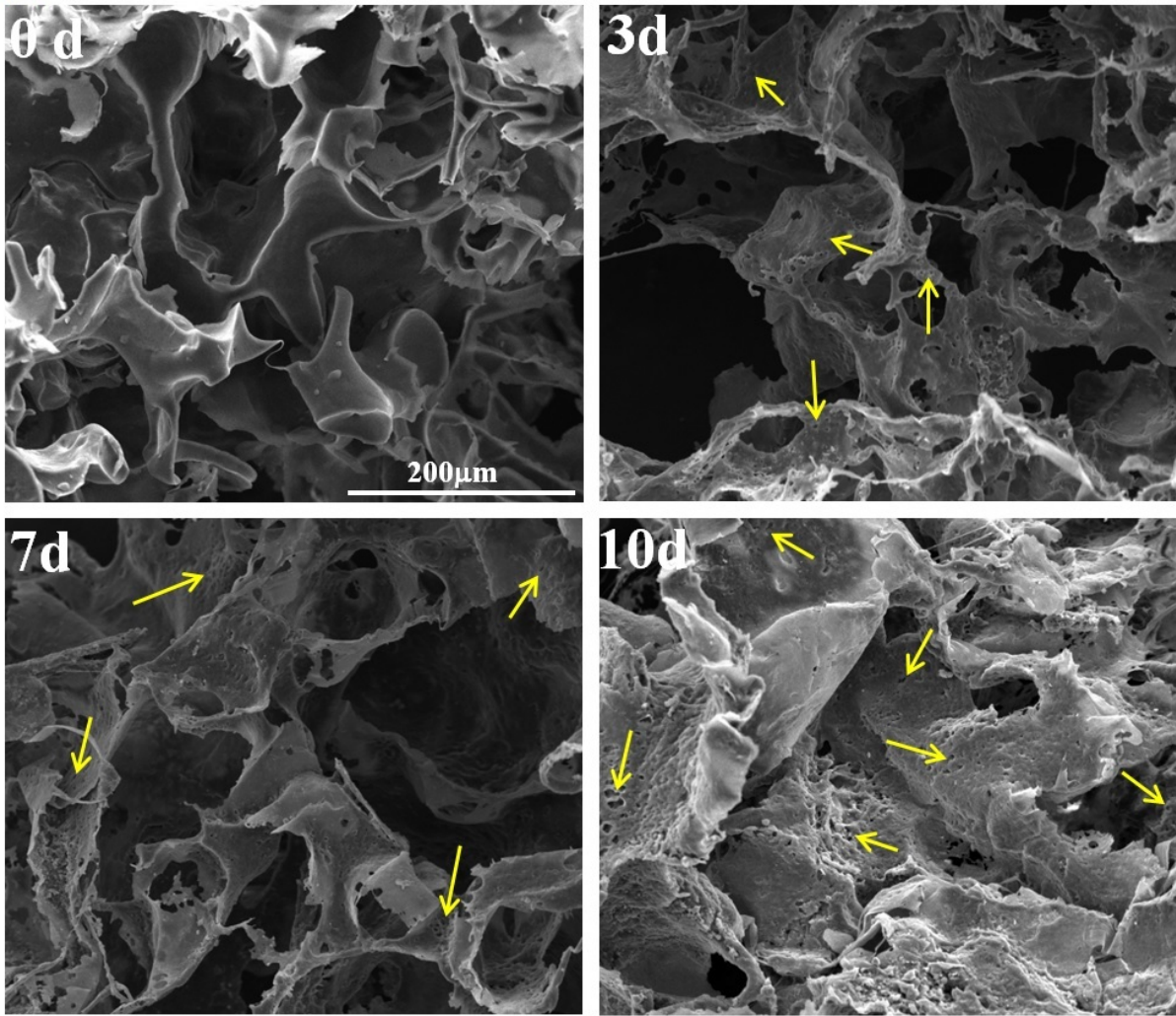
Figure S5: SEM micrographs of hydrolytically degraded PCL/RGO_Sr_5 scaffold over time (days). Arrows indicate micropores seen in the scaffold walls over time.
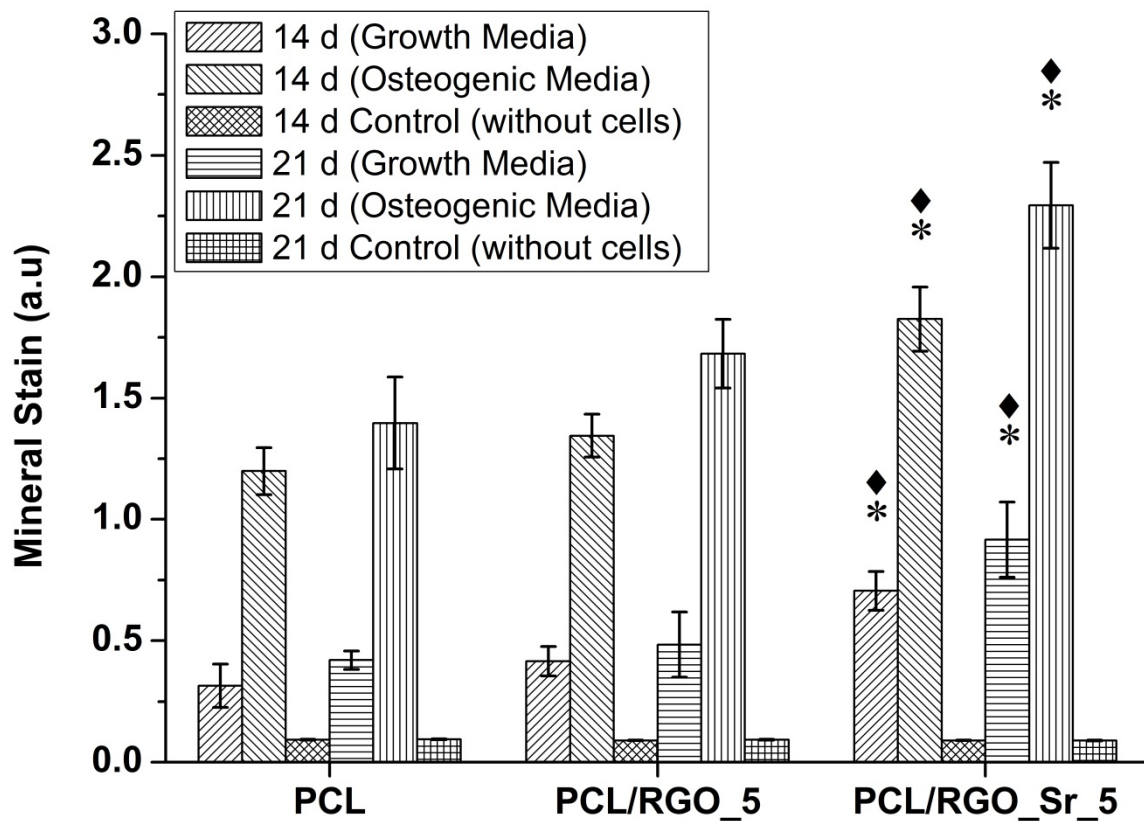
Figure S6: Quantification of mineral stained by ARS dye on PCL, PCL/RGO_5 and PCL/RGO_Sr_5 with normal media and osteogenic supplement media at 14 days and 21 days. Results represent average ± SD for n = 5. Statistically significant differences ($p < 0.05$) compared to neat PCL and PCL/RGO_5 are indicated by the symbols ∗ and ♦, respectively.