

Figure 1. Differential weight loss thermograms of (A) Sodium alginate/graphene oxide (Na-Alg/GO); (B) Calcium alginate/reduced graphene oxide (Ca Alg/Gr), and (C) Barium alginate/reduced graphene oxide (Ba Alg/Gr) composites. Figure (D) gives the total relative relative weight loss dependence on the amount of the filler, taken at the decomposition temperature. Dashed lines serve as guides to the eye only

Figure 2. Electrical conductivity of alginate composites versus the weight fraction of filler.

Figure 3. Storage modulus values for composite films of (A) Na-Alg/GO, (B), Ca-Alg/rGO, (C) Ba-Alg/rGO and (D) its dependence on filler concentration for various types of alginates at 30 °C. Dashed lines serve as guides to the eye only.

Figure 4. Loss modulus at $1s^{-1}$ versus temperature curves for (A) Ca-Alg/rGO and (B) Ba-Alg/rGO composites. Glass transition temperatures, as determined from the peak of loss modulus, for various compositions of (C) Ca-Alg/rGO and (D) Ba-Alg/rGO composites. Different colors represent different compositions as indicated in the graphs (A) and (B). Dashed lines serve as guides to the eye only.

Figure 5. Creep compliance and strain recovery for (A,B) Na-Alg/GO, (C,D) Ca-Alg/rGO, and (E,F) Ba-Alg/rGO composites. Lines are fits by a modified Burgers' four element model , see text.

Figure 6. Master curves of creep compliance versus scaled time for (A) Calcium alginate and its composites, and (B) Barium alginate and its composites at 60°C. The insets show the shift factors used in the scaling.

Figure 7. Predicted and measured reinforcement of Na Alg by GO as a function of filler weight fraction. The inset shows the order parameter $\langle P_2 \rangle$ as a function of GO concentration. The reinforcement is taken to be the elasticity of the composite material relative to the elasticity of the polymer matrix (data from Fig. 3 D).

Figure 8. (A) Average number, N , of GO sheets per stack depending on the weight fraction of the filler. (B) Stretching exponent versus average number N of GO sheets per stack