

Effect of Polymer Graft Modification on the Mechanical Properties and Processability of
Particulate Materials

최지훈[†], Artavazd Kirakosyan

충남대학교

(jihoonc@cnu.ac.kr[†])

The complementary physical properties of the distinct constituents render polymer-grafted nanocrystals (PGNPs) intriguing materials systems in which property characteristics can be tuned over a wide range from hard particulate to soft polymer-type. Here, the effect of polymer modification on the deformation characteristics and processability of particle assembly structures is analyzed as a function of particle size and degree of polymerization of surface tethered chains. The increased fracture toughness of particle brush structures (with sufficient degree of polymerization of tethered chains) enables the fabrication of ordered colloidal films and even complex 3D shapes by scalable polymer processing techniques such as spin coating and micromolding. The results therefore suggest new opportunities for the processing of colloidal material systems that could find application in the viable fabrication of functional components or systems compromised of colloidal assembly structures.