

# **Destabilized Bentonite as Co-Nanofiller in The Hybrid Ethylene Vinyl Acetate Nanocomposites for Biomedical Applications**

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## **ABSTRACT**

Ethylene Vinyl Acetate (EVA) is a promising copolymer for biomedical applications. Improvement in its flexibility, strength and toughness is crucial for close contact with human soft tissue and extending its life expectancy as biomaterial. In this chapter, interlayers destabilization process of bentonite is highlighted as an innovative technique to improve the filler dispersion during the EVA nanocomposite fabrication, thereby the mechanical properties of the material. The 'destabilized' bentonites were used as co-nanofiller with the organically modified montmorillonite (OMMT) to form hybrid silicate nanofillers for EVA copolymer matrix reinforcement. Findings show that the 'destabilized' bentonite prepared by the combination of pH control and salt addition is most efficient in reinforcing the EVA matrix when combined with the OMMT by allowing most significant improvement in the tensile strength, elongation at break and toughness values. This could be related to the improved dispersion of bentonite upon the destabilization process that allows greater matrix-filler interactions in the nanocomposite system. In summary, destabilization process through pH control and salt addition is the promising and practical technique to improve the dispersion of bentonite throughout the polymer matrix. Without the use of expensive and toxic chemicals, it can be adopted as a new approach to swell bentonite for use as co-nanofiller in the biomedical EVA nanocomposites.

**Key words:** bentonite; ethylene vinyl acetate; nanocomposites; destabilization, mechanical properties