# Advances in Clay-Based Bionanocomposite Functional Materials

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## Abstract

This communication will introduce an overview on recent works, mainly developed in our Group, concerning functional composites based on the assembly of clay minerals to biopolymers. Clay Minerals are natural or synthetic silicates showing structural arrangement and morphologies typically of 2D phyllosilicates, which can be present as nanoplatelets (e.g. montmorillonite), nanofibers (e.g. sepiolite, palygorskite) or nanotubes (e.g. imogolite, halloysite). They can act as reinforcing charges of the involved polymer matrices as well as nanoparticles affording functional properties to the resulting hybrid materials.
Recent examples of clay-based bionanocomposites incorporating diverse polysaccharides, including nanocellulose, will be here introduced emphasizing on their properties as biocompatible and biodegradable materials, showing interest as bioplastics and as fire-resistant composites. These composites can be considered as advanced eco-materials including applications as diverse as the removal of pollutants from wastewater, electrode materials and sensing agents for electrochemical and electroanalytical devices and, viral particles immobilization for adjuvants of vaccines, etc. [1-3]. A paradigmatic example consists in the development of nanostructured clay-based carbonaceous materials containing carbon nanotubes and graphenes assembled to smectite and fibrous clay silicates, which appears of great interest for applications as improving components of electrochemical devices [4-5].

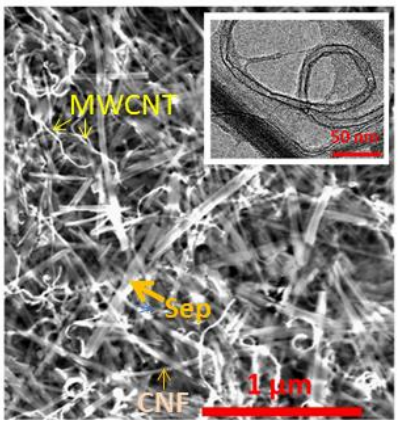


**Figure 1:** FE-SEM image of sepiolite (Sep), cellulose nanofibers (CNF) and MWCNT bionanocomposite [3]

## References

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