

## **Highly filled synthetic clay-polymer nanocomposites produced by self-assembly techniques**

Nelson Marcos Laroocca, Luiz Antonio Pessan\*

<sup>1</sup> Federal University of São Carlos – Materials Engineering Department – São Carlos - Brazil

#Corresponding author: pessan@ufscar.br

The assembling of polymer-nanoclays nanocomposites from conventional methods like extrusion melt compounding could not allow to synthesize high-performance materials, since these methods cannot avoid the nanoparticles agglomeration in concentrations above around 10 wt.%. Nanocomposites filled with nanoparticles in high concentrations and yet highly organized and not agglomerated can be achieved from self-assembly techniques, like layer-by-layer and evaporation induced self-assembly. In this work these two assembling techniques were utilized to produce polymeric nanocomposites containing lamellar nanoparticles of layered double hydroxides (LDH). For both methods it was successfully achieved nanocomposites films with high nanoparticles concentrations (above 20 wt.%) and yet transparent, since the nanoplatelets were dispersed with high spatial organization and with no agglomeration as shown by microscopy analysis. This nanostructure by its turn lead to very interesting properties for technological applications, like a significant reduction of gas permeability and an increasing of 84 % of mechanical modulus for nanocomposite with 50 wt.% of LDH.