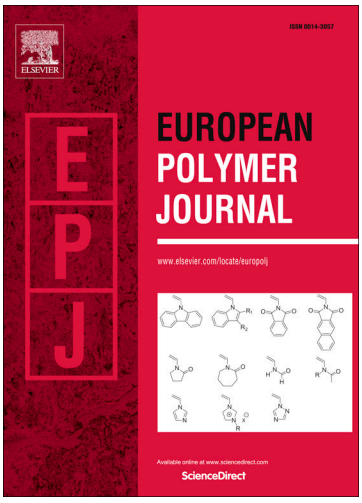


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# Synthesis of polyethylene/silica-silver nanocomposites with antibacterial properties by *in situ* polymerization

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**Abstract**

Synthesis of polyethylene/silica-silver nanocomposites (PE/SiAg) by *in situ* polymerization with supported and non-supported catalysts was achieved using the $Cp_2ZrCl_2$/MAO catalytic system. Silica-silver nanoparticles (SiAg) were synthesized via two routes (acidic and basic) and characterized to determine the silver content, morphology, and size. The basic route resulted in particles with a lower concentration of silver and with smaller diameters. The polymerizations of ethylene in the presence of the fillers produced high yields of nanocomposites. The catalyst support in SiAg was efficient, although the percentage of Zr effectively immobilized was very low. Polyethylene melting and crystallization temperatures did not change significantly with the addition of the filler. SEM images showed differences in the morphologies between the supported and non-supported catalysis, and between the acidic and basic conditions for SiAg preparation. Two different tests were performed and showed that the nanocomposites inhibited the proliferation of bacteria in contact with the films.

Keywords: Silver nanoparticles; polymerization; nanocomposites.