# Poly(acrylonitrile)-molybdenum disulfide polymer electrolyte nanocomposite

Santa Ana, María Angélica

Benavente, Eglantina

Gómez-Romero, Pedro

González, Guillermo

The synthesis, characterization and electrochemistry of a novel nanocomposite based on the co-intercalation of lithium and poly(acrylonitrile) (PAN) in molybdenum disulfide [Li0.6MoS2(PAN)1.2·0.5H2O] is described. The product, obtained chemically by treating LiMoS2 directly with a colloidal suspension of PAN in benzene, has a lamellar structure with an interlaminar distance of 1.15 nm. Elemental analysis, FT-IR spectra, thermal analysis and 7Li MAS-NMR spectra indicate that the polymer is co-intercalated with lithium in the MoS2 matrix. Lithium can be de-intercalated and intercalated electrochemically from the nanocomposite in the range x = 0.1-0.8. The structure of the interlamellar phase and the state of lithium in the Li xMoS2(PAN)1.2 intercalates are discussed by comparing the behavior of both the potential and the diffusion coefficient with those of the poly(ethylene oxide) (PEO) and diethylamine (DEA) MoS2 intercalates. Both, the average quasi-equilibrium Li/Li+ potential of PAN