

A cyclic and polymeric phosphazene as solid state template for the formation of RuO₂ nanoparticles

Díaz, C.

Valenzuela, M. L.

Spodine, E.

Moreno, Y.

Peña, O.

Pyrolysis of the organometallic polymer: $\{[N=P(R_1)]_{0.8}[N=P(OC_6H_4CH_2CN[Ru])_2]_{0.15}[N=P((OC_6H_5)(OC_6H_4CH_2CN[Ru]))_{0.05}]\{Cl\}_{0.31}\}_n$, $[Ru]=CpRu(PPh_3)_2$, $R_1 = O_2C_{12}H_8$ (1) as well of the cyclic specie $\{N_3P_3(OC_6H_5)_5(OC_6H_4CH_2CN[Ru])\}\{PF_6\}$ (2) under a flow of air at 800°C affords nanostructured RuO₂. Nanoparticles near to 10 nm were observed. The differences in the use of cyclic or polymeric phosphazenes, as solid state template, influence strongly the morphology and slightly the composition of the pyrolytic product. Temperature variable (SQUID) measurements in the range of 5-300 K of the material obtained from the polymer, indicate an antiferromagnetic interaction between the Ru atoms, although lower than that found for the crystalline ruthenium oxide, probably due to some amorphous product present in the pyrolytic material. The possible formation mechanism is discussed and the differences in using the cyclic or the polymeric compound as precursor is analyzed in terms of the relative conte