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A New Green Chemical Synthesis Strategy for Synthesis of L10 FePt Nanoparticles from Layered Precursor $Fe(H_2O)_6PtCl_6$ GEORGE HADJIPANAYIS, XIAOCAO HU, University of Delaware, ALDO CAPOBIANCHI, Istituto di Struttura della Materia, RYAN GALLAGHER, University of Delaware — In this work, a new green chemical strategy for the synthesis of $L1_0$ FePt nanoparticles is reported. The starting material is a polycrystalline molecular complex ($Fe(H_2O)_6PtCl_6$), in which Fe and Pt atoms are arranged on alternating planes. The starting compound was milled with crystalline NaCl and then annealed under forming gas (5 % H_2 and 95 % Ar) at 450 °C for 2h. Finally, the mixture was washed with water to remove the NaCl and $L1_0$ FePt nanoparticles were obtained. Transmission electron microscopy (TEM) images revealed that this method is able to produce $L1_0$ nanoparticles with different average size varying from 13.9 nm to 5.4 nm depending on the ($Fe(H_2O)_6PtCl_6$)/NaCl ratio. With smaller ($Fe(H_2O)_6PtCl_6$)/NaCl ratio(10mg/20g) and longer milling time(15h), FePt nanoparticles had a smaller size and narrower size distribution. The X-Ray Diffraction (XRD) pattern showed the presence of the characteristic peaks of the fct phase. The hysteresis loop, measured both at room temperature and 50 K, shows a high coercivity of 7.6 kOe and 11.2 kOe, respectively as expected for the high anisotropy $L1_0$ phase. Larger precursor/NaCl ratio and shorter ball milling time led to larger coercivity.

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