Struktur Magnetik pada CaMnO3 dan LaMnO3 dengan Difraksi Neutron

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Abstrak

Information about magnetic structure can not be obtained through X ray diffraction method. Therefore data from neutron diffraction are needed to find out substance magnetic structure. From that structure, we can get information about magnetic crystal structure and magnetic momentum or the structure of the spin. The research is aimed to find out magnetic structure at CaMnO3 dan LaMnO3 in powder. The preparation of CaMnO3 and LaMnO3 substance is made through powder method and stoikiometric calculation. Basic substance of CaMnO3 is CaCO3 and MnO2, while basic substance of LaMnO3 is La2O3 and MnO2. After the substances are mixed, time varied milling, temperature varied sintering and annealing are conducted. It is hoped that the substances will be united or form a new phase.

The magnetic structure study of CaMnO3 and LaMnO3 at this research are explained by neutron powder diffraction. CaMnO3 is good analisis at crystal system on orthorhombic space group Pnma with lattice parameter at 12 k is a = 5.2692 Å, b = 7.4403 Å, c = 5.2596 Å. LaMnO3 is good analisis at crystal system on monoklinik space group P1121/a with lattice parameter at 12 K is a = 5.4726 Å, b = 7.7613 Å, c = 5.5324 Å. Magnetic parameter Mn atomic has charge ordered of CaMnO3 and LaMnO3 is Mn4+ ion and Mn3+ ion.

Result at research with High Resolution Powder Diffractometer, HRPD to find, CaMnO3 has properties magnetic at Mn atomic with indeks miller hkl (011) angle 2 = 24.486 on 12 K. LaMnO3 has properties magnetic at Mn atomic with indeks miller hkl (200) and angle 2 = 38.966°. Magnetic structure Mn atomic at 4b(0,0, 2 1) simetri of CaMnO3 is four possible nonkolinear ferromagnetic, with value magnetic momen is m(Mn) = 1.73 B µ . Magnetic structure Mn atomic of LaMnO3 at 2c(0,0, 2 1) is two possible (antiferomagnetik and ferromagnetic) and 2d(2 1 , 2 1 ,0) simetri is two possible antiferromagnetic, with value magnetic momen is m(Mn) = 2.23 B µ .