Magnetic behavior of Fe-Mn mixed oxide

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Manganese ion presents three different valence states in the series of studied oxides of complex structure[1]. The bixbyite structure is presented as the metal atoms are at the cent,er of a cube of oxygen of which two sites are vacant. These two vacancies are distributed over the eight sites in two different ways: the two vacancies form (i) the ends of a face diagonal of the cube of oxygen, or (ii) the ends of a body diagonal. The centers of the cubes formed by oxygen-vacancy distributions, or (i) and (ii) are called d and b sites, respectively. The unit cell contains 24 d and 8 b sites, i.e. there are three times as many d sites as b sites available for the metal atom[2].The bixbyite structure has the 16 vacancies (a quarter of the tetrahedral holes in the FCC cation array) correspond to the positions of the 16c site of the space group Ia-3, and that when an anion vacancy [3].The samples were prepared by standard ceramic methods, solid state reaction technique using manganese and iron oxides. Those samples were calcined at 460°C and 750°C and sintered at 980°C, 1000°C and 1150°C. Parameters magnetic are measured by hysteresis loop (Magnetization M versus Field B). The magnetic properties of samples were characterized by using a vibrating sample magnetometer (VSM). The magnetization of the produced $MnFeO_3$ oxides using vibrating sample magnetometer was performed at room temperature under an applied field of 15 kG and the hysteresis loops of the ferrite powders were obtained (Figure 1a). The bixbyite structure of samples was characterized by X-ray powder diffraction (XRPD) using a diffractometer with Cu Kα radiation. (Figure 1b).

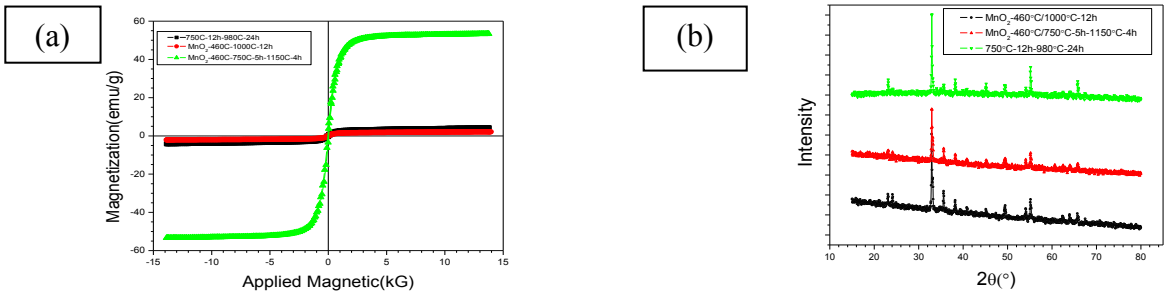

Figure 1: Magnetic and structural characterizations of $MnFeO_3$: M-H hysteresis (a) XRD (b).

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