

EPR study of $\text{Pr}_{0.7}\text{Sr}_{0.3-x}\text{Ba}_x\text{MnO}_3$ Lanthanum manganites

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Among the wide variety of colossal magnetoresistance (CMR) materials the Pr-compositions occupy some special places. Namely, in zero magnetic field the $\text{Pr}_{1-y}\text{Ca}_y\text{MnO}_3$ samples are insulator for any level of Ca doping [1] and show the low field hysteresis [2]. $\text{Pr}_{0.7}\text{Ba}_{0.3}\text{MnO}_3$ composition also is insulating one at low as well as at high temperatures [3, 4]. The combined Pr- and (Sr, Ba) -doped perovskite like manganites should show interesting properties due to big difference between the Pr and Sr, Ba ionic size. In this work we present an electron paramagnetic resonance (EPR) study of $\text{Pr}_{0.7}\text{Ca}_{0.3-x}\text{Ba}_x\text{MnO}_3$ perovskite ($x = 0, 0.15$ and 0.3). We observed that the intensity of EPR line decrease exponentially with temperature. The activation energy values derived from the temperature dependencies of EPR line intensity equals to 0.16 eV, 0.09 eV and 0.08 eV for the $x = 0, 0.15$ and 0.3 compositions, respectively. Temperature dependence of EPR linewidth showed the minimum near the T_C . Temperature and concentration dependencies of EPR linewidth and line intensity will be discussed.

References

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