

## **EPR study of solid solutions $\text{La}_{1-0.33y}\text{Ba}_{0.33y}\text{Mn}_y\text{Al}_{1-y}\text{O}_3$ ( $y = 0.02, 0.04, 0.10$ )**

Andronenko S., Andronenko R., Zagrebel'nyi O.  
*Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia*

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### **Abstract**

Abstract-Solid solutions  $\text{La}_{1-0.33y}\text{Ba}_{0.33y}\text{Mn}_y\text{Al}_{1-y}\text{O}_3$  ( $y = 0.02, 0.04, 0.10$ ) prepared using the ceramic technique have been investigated by the EPR method at temperatures of 77 and 300 K. By comparing with the calculated spectra, the experimental spectra have been assigned to  $\text{Mn}^{2+}$  ions ( $g = 2.04$  and line width  $\delta H_{pp} = 64 \times 10^{-4} \text{ T}$  at  $T=77\text{K}$ ) and  $\text{Mn}^{4+}$  ions ( $g = 1.97$  and  $\delta H_{pp} = 76 \times 10^{-4} \text{ T}$  at  $T = 77 \text{ K}$ ) and the broad line ( $\delta H_{pp} = 500 \times 10^{-4} \text{ T}$  at  $T = 77 \text{ K}$ ) has been attributed to clusters. The dilution of manganese ions as a result of the dissolution of  $\text{La}_{0.67}\text{Ba}_{0.33}\text{MnO}_3$  in  $\text{LaAlO}_3$  has allowed one to trace the cluster formation and the spin dynamics of Mn ions. It has been established that, at room temperature, compared to the system in which the  $\text{Sr}^{2+}$  ion with a smaller ionic radius is the replacing element, the localized states are more stable at all three manganese concentrations (the EPR lines are more intense). The  $\text{La}_{0.67}\text{Ba}_{0.33}\text{MnO}_3$  clusters dissolved in  $\text{LaAlO}_3$  retain some properties of a concentrated compound even upon dilution to  $y = 0.02$ . © Pleiades Publishing, Ltd., 2010.

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### **Keywords**

EPR, Magnetic resonance, Manganites,  $\text{Mn}^{2+}$  and  $\text{Mn}^{4+}$  paramagnetic centers