Significant Improvement of the Oxide Ion Conductivity in the Substituted $La_{0.9}Sr_{0.1}Ga_{1-x-y}Y_xMg_yO_{3-z}$ Perovskite

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The oxide ion conductivity studies on $La_{0.9}Sr_{0.1}Ga_{1-x-y}Y_xMg_yO_{3-\delta}$ (x=0.05, 0.1; y = 0.05, 0.1, 0.15 and 0.2) are reported. A substantial increment in the oxide ion conductivity of 0.13 S cm^{-1} at 700°C has been achieved in the compounds. An increase in the unit cell size of the lanthanum gallate perovskite by substitution of a larger ion (Y^{3+}) at the Ga site provide an optimal bottle-neck size for the oxide ion migration, providing a facile pathway for oxide ion conduction. Results will be discussed based on the ionic conduction pathway in the perovskite lattice.