Synthesis and characterization of novel Li-stuffed garnet-like $Li_{5+2x}La_3Ta_{2-x}Gd_xO_{12}$ ($0 \leq x \leq 0.55$): structure-property relationships

Dalia M. Abdel-Basset [a,b], Suresh Mulmi [a], Mohammed S. El-Bana [b], Suzan S. Fouad [b], and Venkataraman Thangadurai [a,*]

[a] *Department of Chemistry, University of Calgary, 2500 University Drive Northwest, Calgary, Alberta, Canada T2N 1N4.*

[b] *Nano-Science & Semiconductor Laboratories, Department of Physics, Faculty of Education, Ain Shams University, Cairo, Egypt, 11566.*

Supporting information

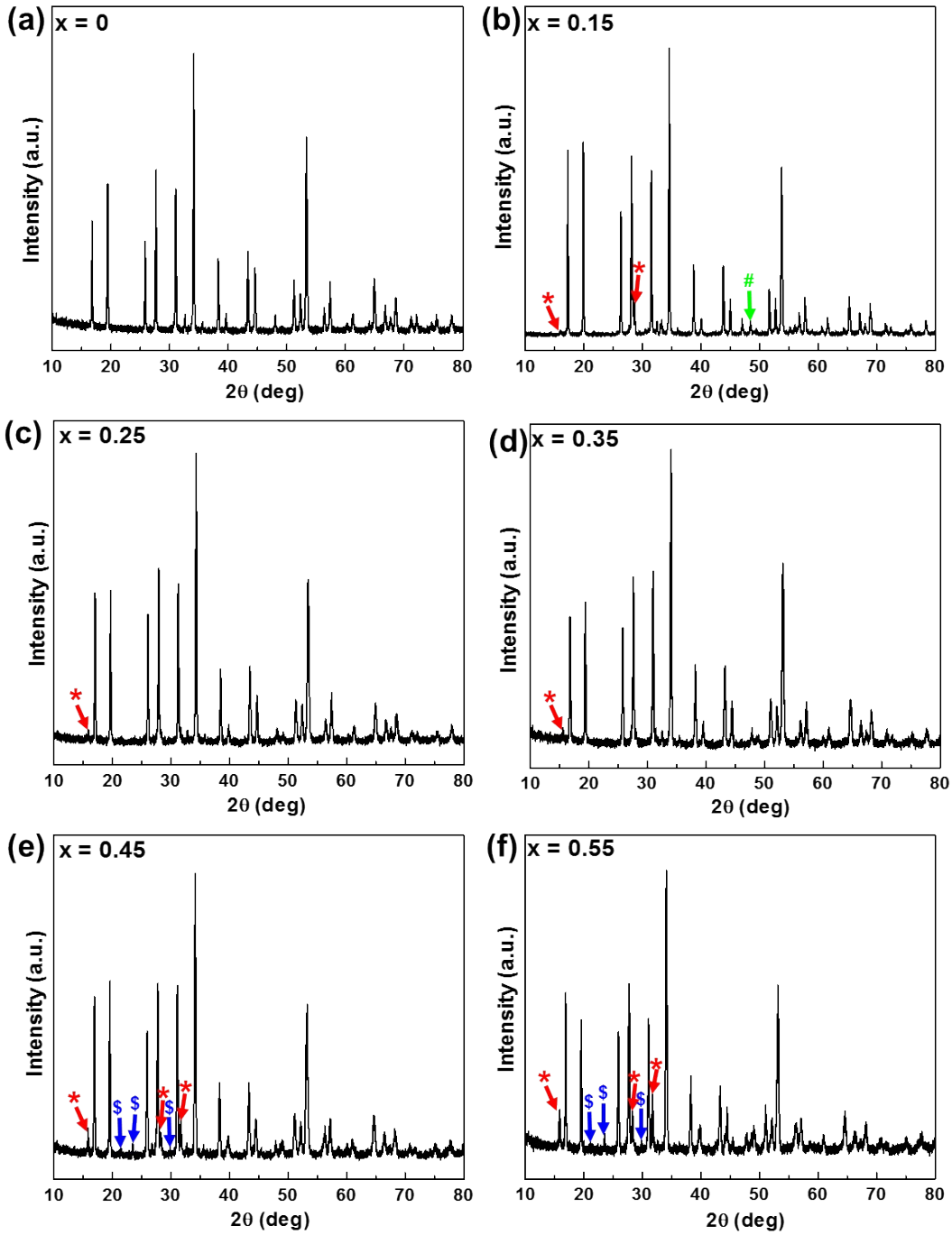

Figure S1. PXRD patterns of as-prepared Gd-doped $Li_{5+2x}La_3Ta_{2-x}Gd_xO_{12}$ ($0 \leq x \leq 0.55$). Major impurity peaks are denoted by "*" (red arrow) correspond to $LaLiO_2$ (JCPDS No. 19-0722), "$" (blue arrow) corresponds to Li_2CO_3 (JCPDS No. 22-1141), and "#" (green arrow) corresponds to Ta_2O_5 (JCPDS No. 18-1304).

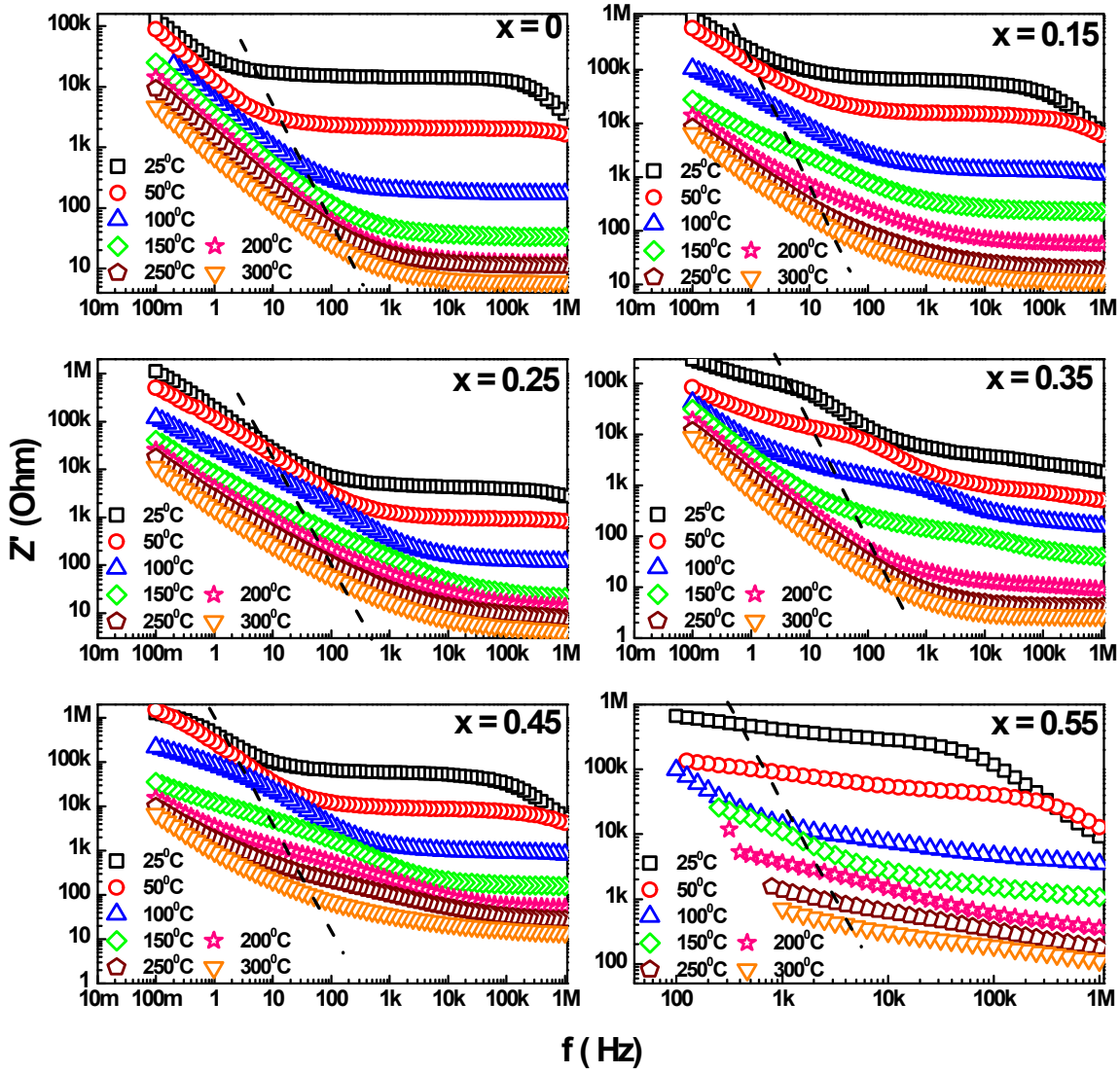

Figure S2. The real part of impedance as a function of frequency of $Li_{5+2x}La_3Ta_{2-x}Gd_xO_{12}$ ($0 \leq x \leq 0.55$) at different temperatures.