Supporting Information

The influence of dopant concentration and grain size on the ability to temperature sensing using nanocrystalline $MgAl_2O_4$:Co^{2+}, Nd^{3+} luminescent thermometers

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KEYWORDS luminescent thermometry, nanocrystals, cobalt, optical windows, spinels

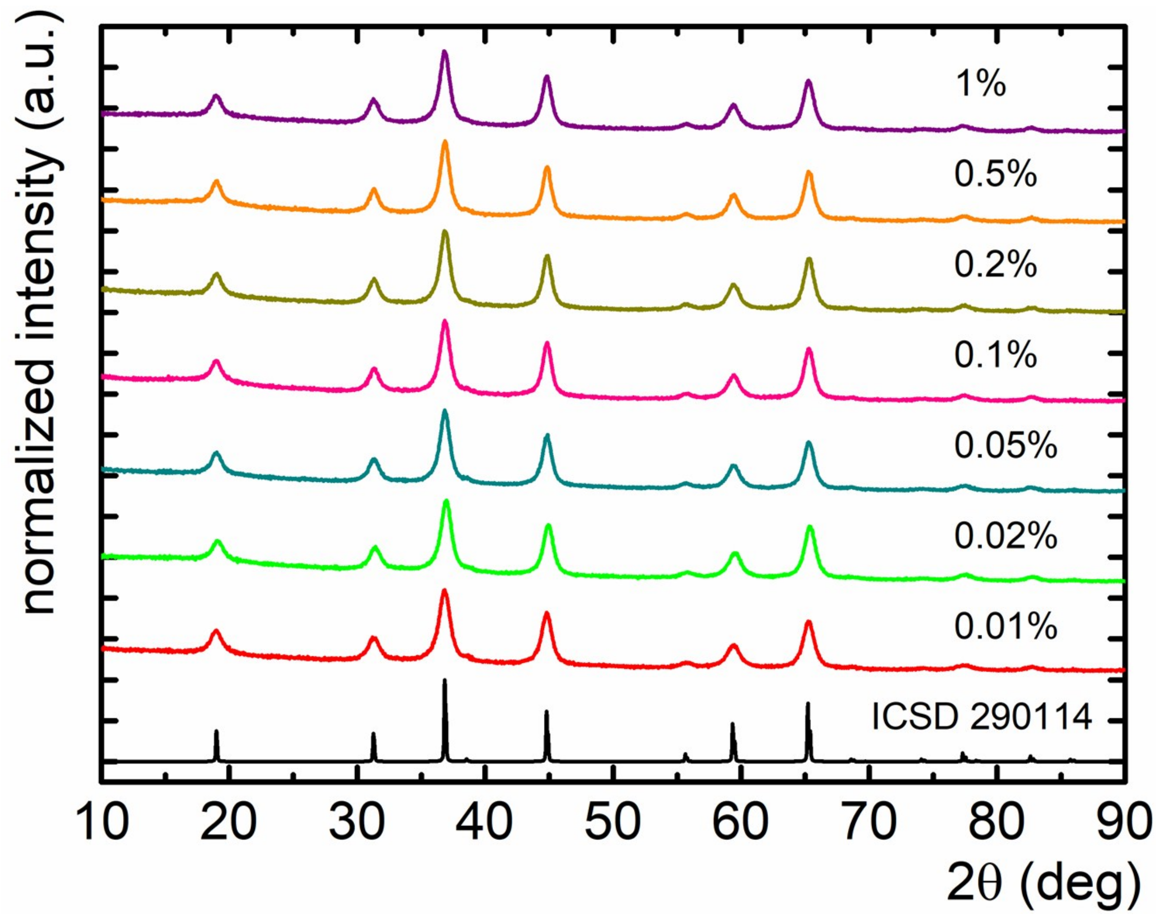

Figure 1. X - ray diffraction patterns of $MgAl_2O_4$: Co^{2+} nanoparticles with various cobalt concentration annealed at 850 ℃

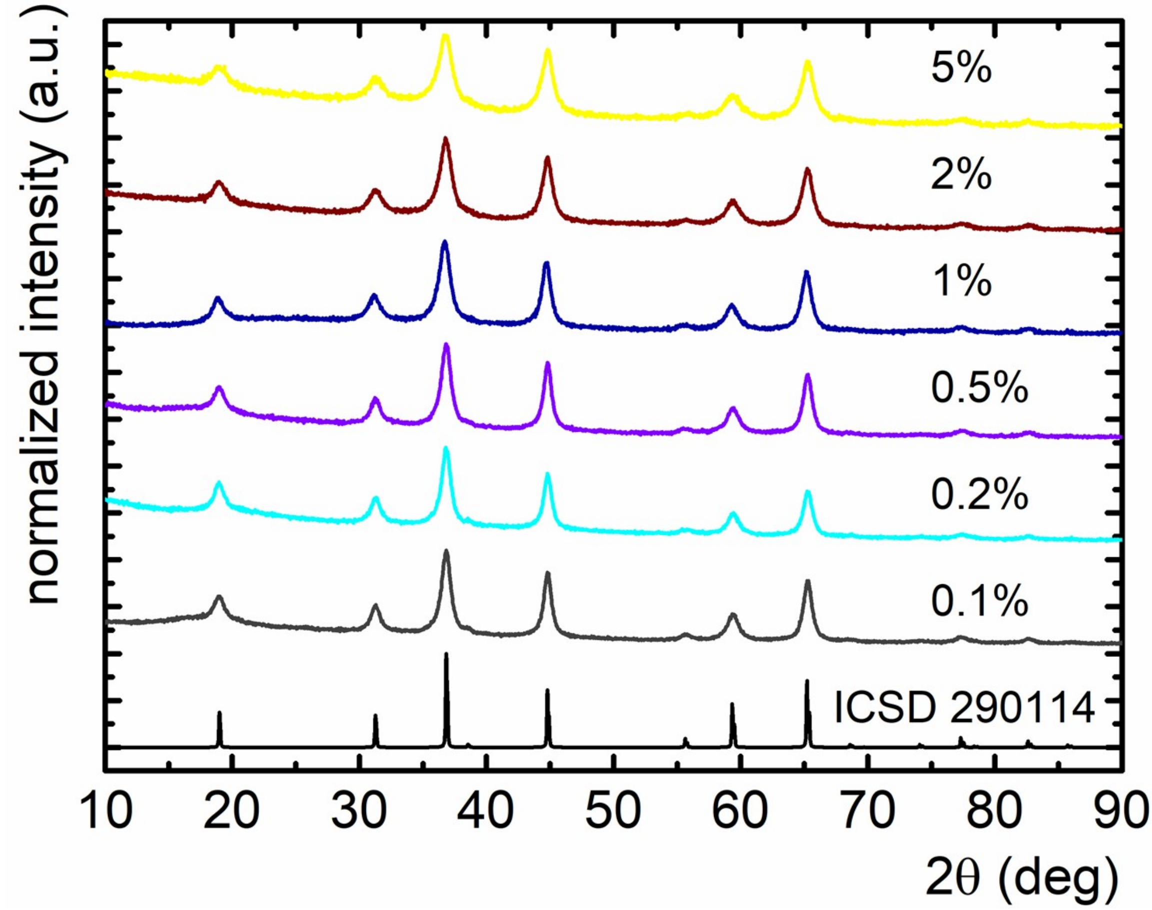

Figure 2. X - ray diffraction patterns of $MgAl_2O_4$: Nd^{3+} nanoparticles with various neodymium concentration annealed at 850 ℃

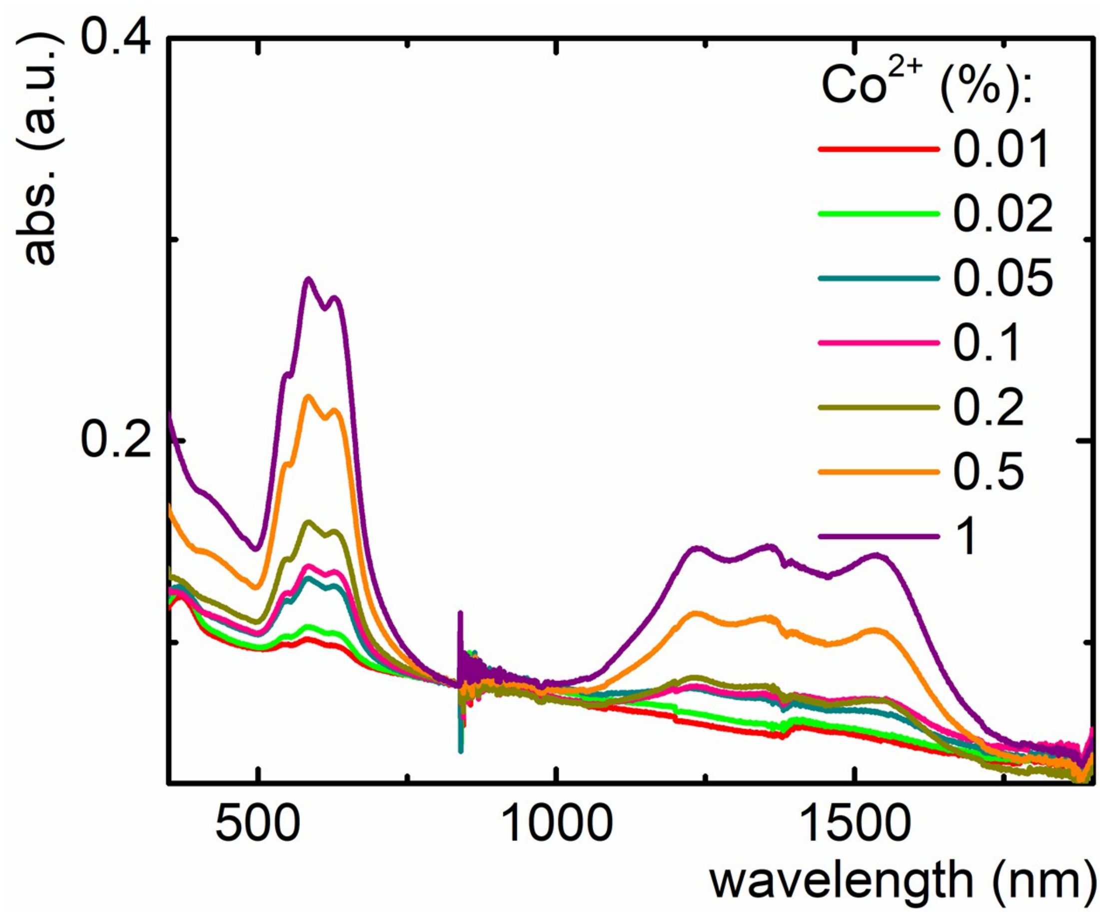

Figure 3. Absorption spectra of $MgAl_2O_4$: Co^{2+} with different cobalt concentration annealed at 850℃

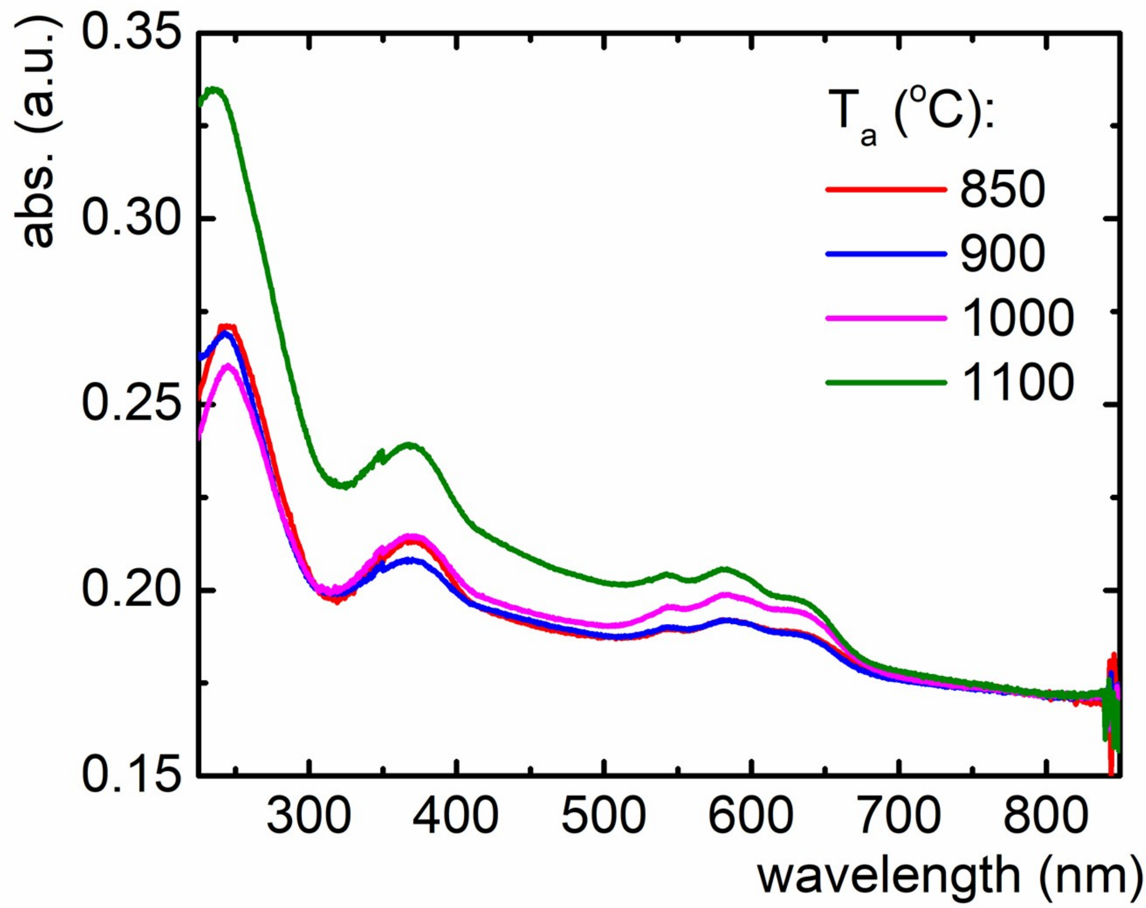

Figure 4. Absorption spectra of $MgAl_2O_4$: 0.01% Co^{2+} annealed at 850℃, 900℃, 1000℃, 1100℃

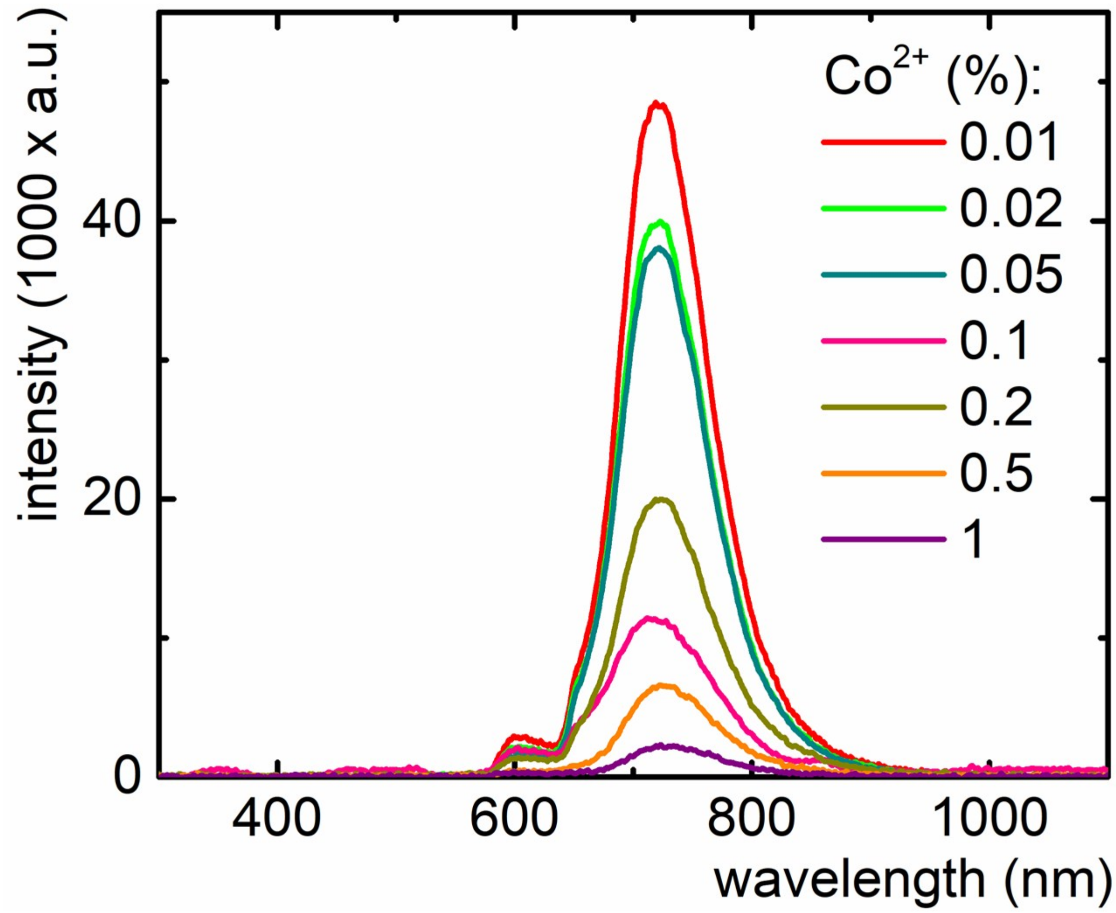

Figure 5. The comparison of emission spectra of $MgAl_2O_4$: Co^{2+} with various cobalt concentration annealed at 850℃ and measured at -150℃

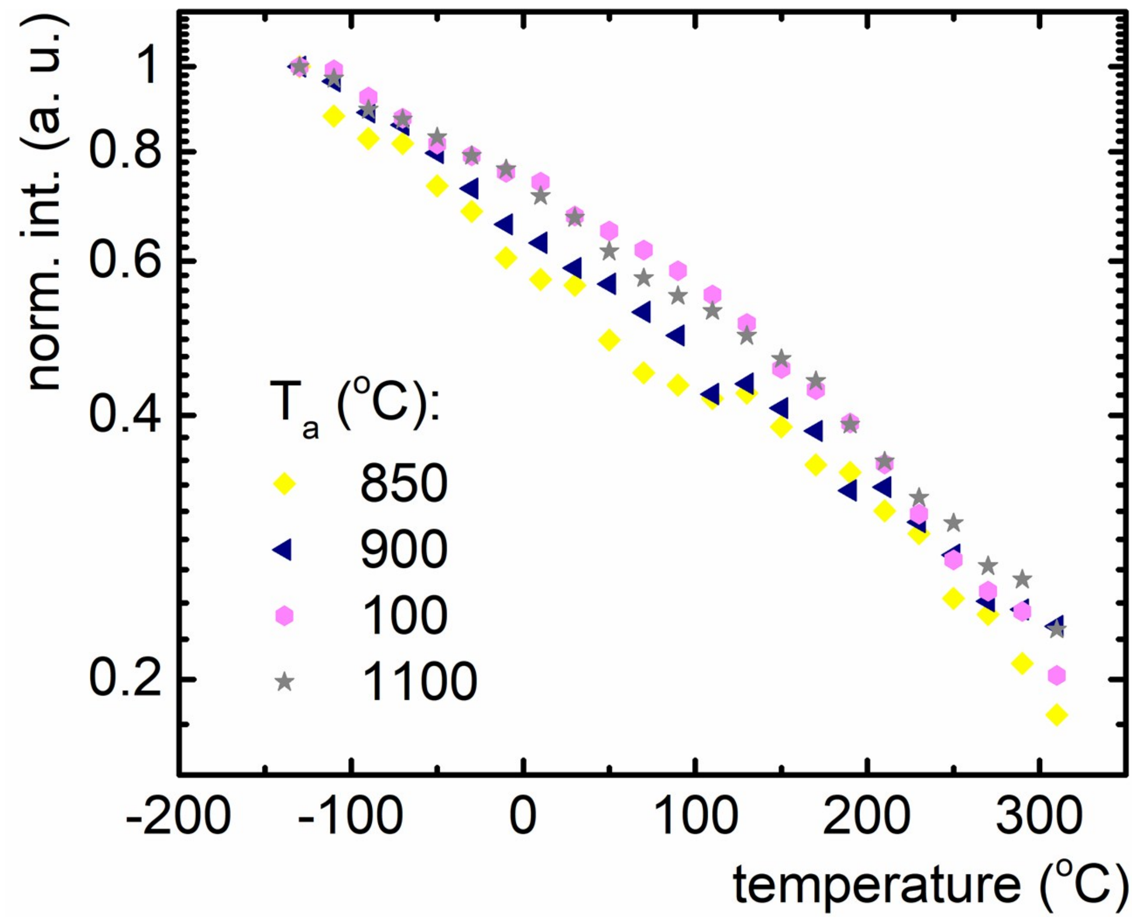

Figure 6. The influence of the temperature on the emission intensity of Co^{2+} in $MgAl_2O_4$: 0.01% Co^{2+}, 5% Nd^{3+} annealed at various temperatures

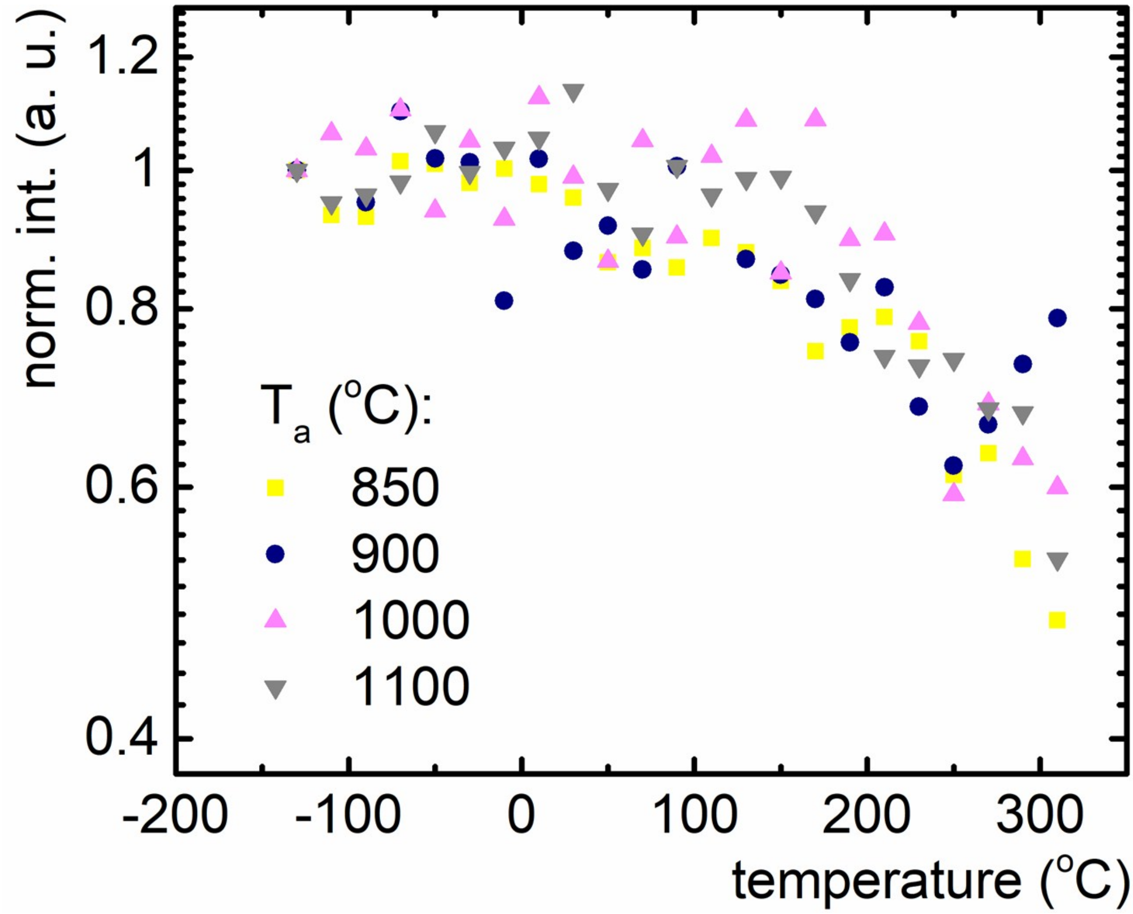

Figure 7. The influence of the temperature on the emission intensity of Nd^{3+} in $MgAl_2O_4$: 0.01% Co^{2+}, 5% Nd^{3+} annealed at various temperatures

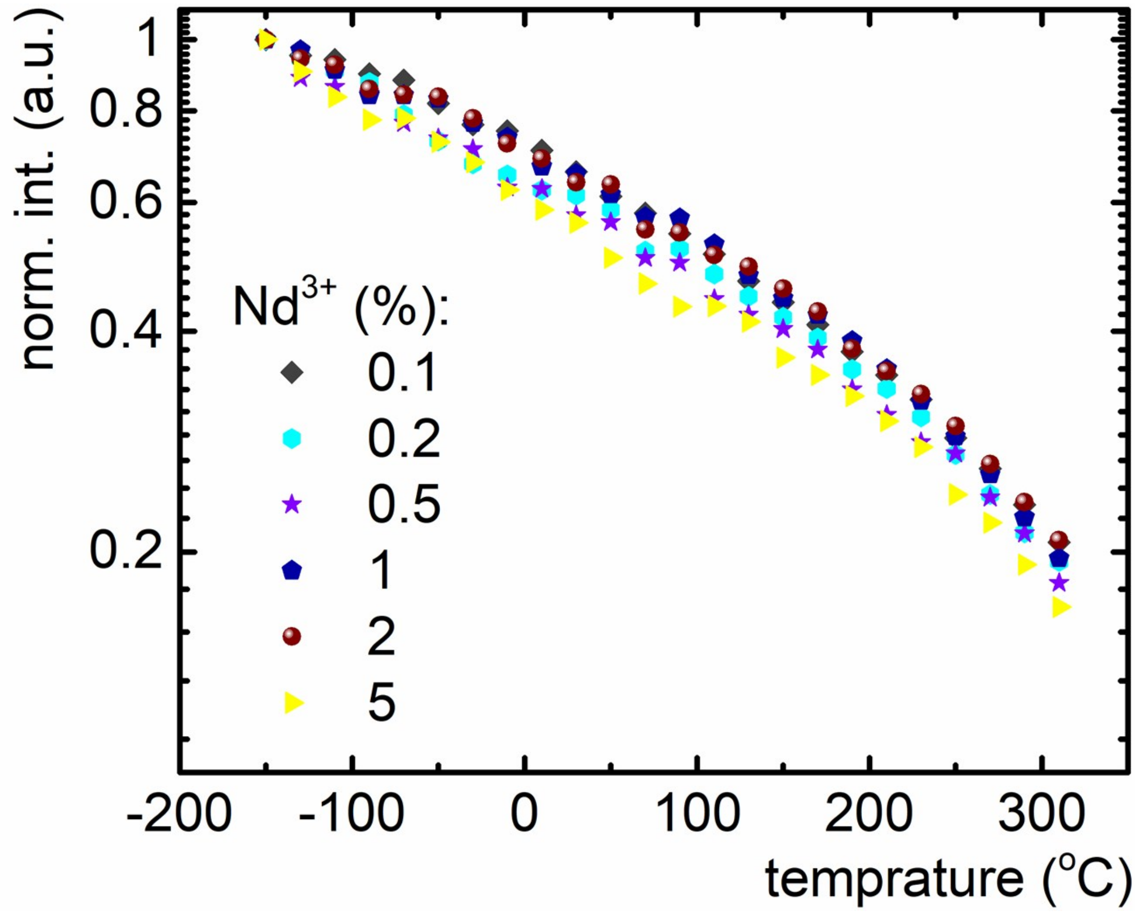

Figure 8. The influence of the temperature on the emission intensity of Co^{2+} in $MgAl_2O_4$: 0.01% Co^{2+}, X% Nd^{3+} with various neodymium concentration

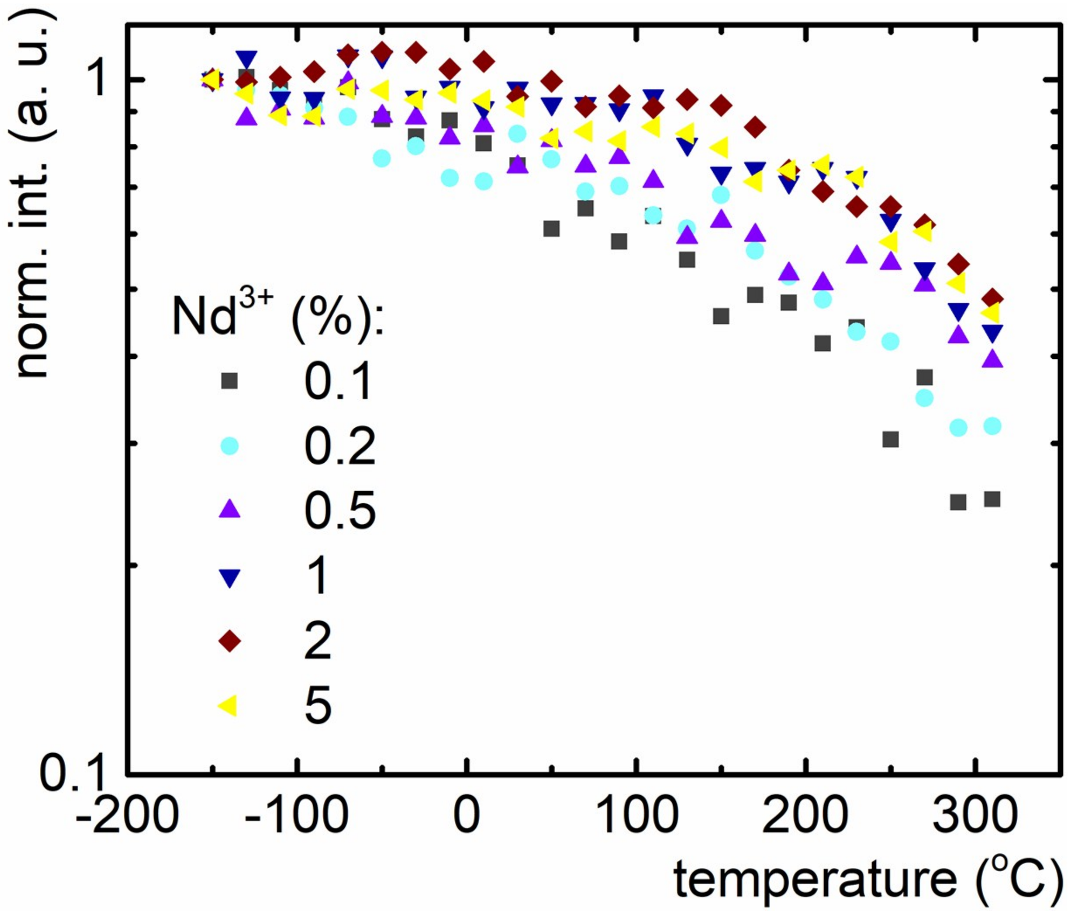

Figure 9. The influence of the temperature on the emission intensity of Nd^{3+} in $MgAl_2O_4$: 0.01% Co^{2+}, X% Nd^{3+} with various neodymium concentration

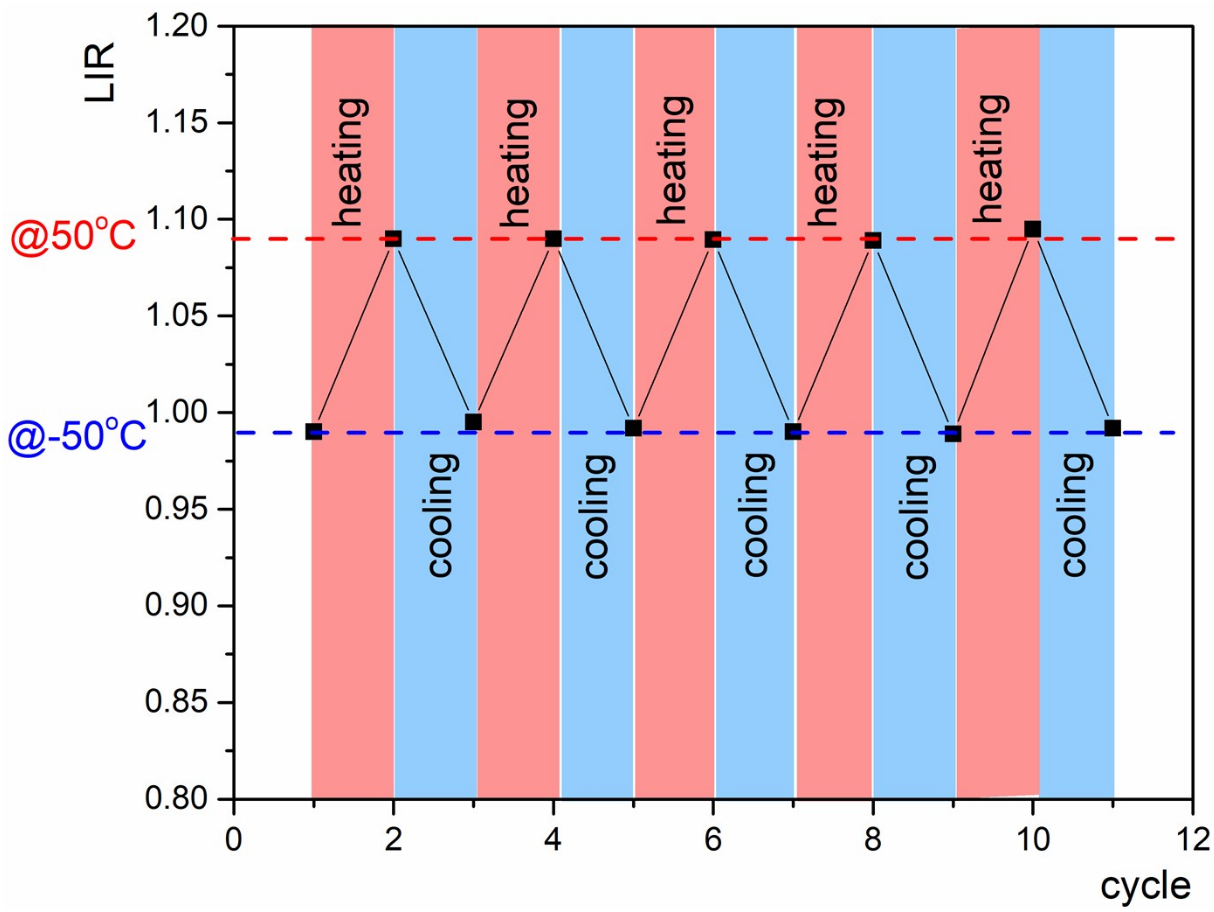

Figure S10. Thermal stability of $MgAl_2O_4$: 0.02% Co^{2+}, 5% Nd^{3+} nanocrystals during cooling (-50°C) and heating (50°C) cycles