

## Electrical and Optical Characterization of NdAlO<sub>3</sub> Nanoparticles

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### ABSTRACT

Nanocrystals of neodymiumaluminate (NdAlO<sub>3</sub>) are synthesized using an optimized single step auto-ignition citrate complex combustion process. The combustion product was characterized by X-ray diffraction, transmission electron microscopy, Fourier transform infrared spectroscopy, Raman spectroscopy and Ultraviolet–visible reflection spectroscopy. The combustion product is single phase and composed of aggregates of nanocrystals of sizes in the range 20–40 nm. The NdAlO<sub>3</sub> crystallized in rhombohedral perovskite structure with lattice parameters  $a = 5.3223 \text{ \AA}$  and  $c = 12.9292 \text{ \AA}$ . The absorption spectrum of the NdAlO<sub>3</sub> nanocrystals shows characteristic absorption bands of the Nd atom. The polycrystalline fluffy combustion product is sintered to high density (~97%) at ~1450 °C for 4 h and the microstructure was characterized by scanning electron microscopy. The electrical properties of the sintered product were studied using dielectric measurements. The sintered NdAlO<sub>3</sub> has a dielectric constant ( $\epsilon_r$ ) and a dielectric loss ( $\tan \delta$ ) of 21.9 and ~10–3 at 5 MHz, respectively.

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