Electronic Supplementary Material (ESI) for Nanoscale.

SUPPLEMENTAL INFORMATION

Novel Multi-functional Europium-Doped Gadolinium Oxide Nanoparticle Aerosols Facilitate the Study of Deposition in the Developing Rat Lung

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Table S1. Significant differences in regional deposition of Gd_2O_3:Eu^{3+} NPs between age groups.

(a) Statistical difference in total deposition of Gd_2O_3:Eu^{3+} NPs in each region measured (ng particles)

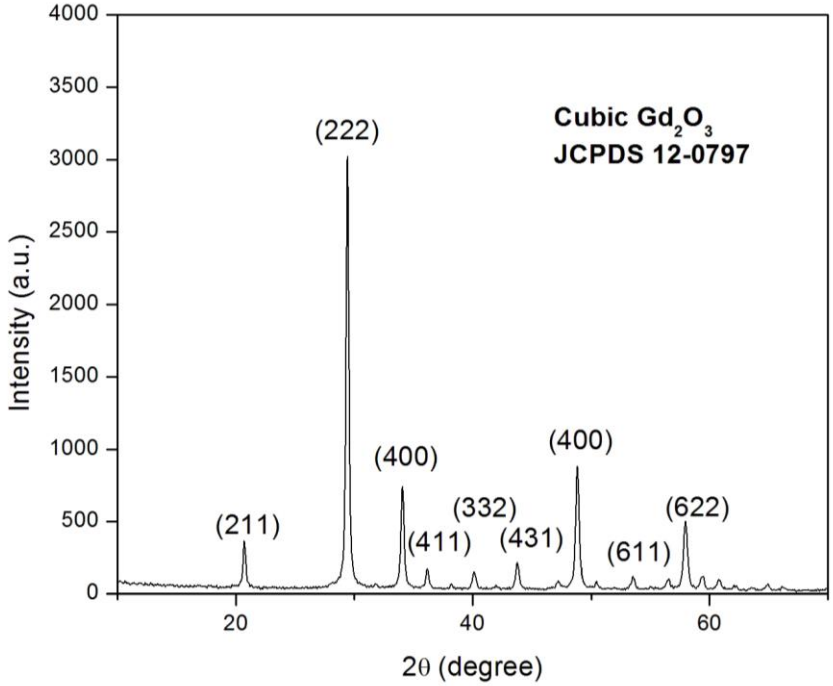
Region	Neonate vs Juvenile	Neonate vs Adult	Juvenile vs Adult
Left lobe	**	**	**
Cranial lobe	**	**	*
Middle lobe	**	**	*
Caudal lobe	**	**	**
Accessory lobe	**	**	**
Trachea/Lobar Bronchus	**	**	*
Nose	n/a	n/a	*
All regions combined	**	**	**

(b) Statistical difference in deposition of Gd_2O_3:Eu^{3+} NPs per gram of tissue in each region measured (ng particles/g tissue)

Region	Neonate vs Juvenile	Neonate vs Adult	Juvenile vs Adult
Left lobe	**	**	ns
Cranial lobe	**	**	ns
Middle lobe	**	**	ns
Caudal lobe	**	**	ns
Accessory lobe	**	*	ns
Trachea/Lobar Bronchus	*	ns	*
Nose	n/a	n/a	ns

* $p<0.05$
** $p<0.01$
ns = not significant
n/a = not applicable due to neonate nose deposition below level of detection.

(a)



(b)

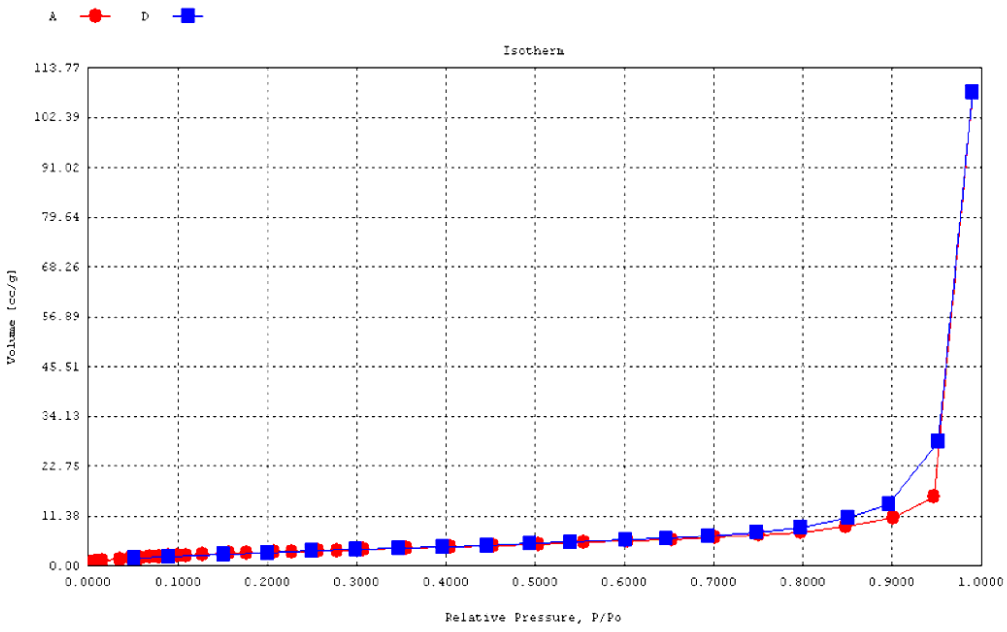


Figure S1. (a) XRD pattern suggesting the cubic crystallinity of the flame synthesized Gd_2O_3:Eu^{3+}. (b) BET nitrogen adsorption-desorption isotherms, which determines the specific surface area of the nanoparticles. Red and blue points in the isotherm correspond to adsorption and desorption cycles, respectively. Estimation of surface area of the Gd_2O_3:Eu^{3+} NPs was 21.12 m^2g^{-1}.

Figure S2. Digital photograph of the nanoparticles pellet excited with a UV lamp (254 nm) shows typical red emission from Eu^{3+} ions.

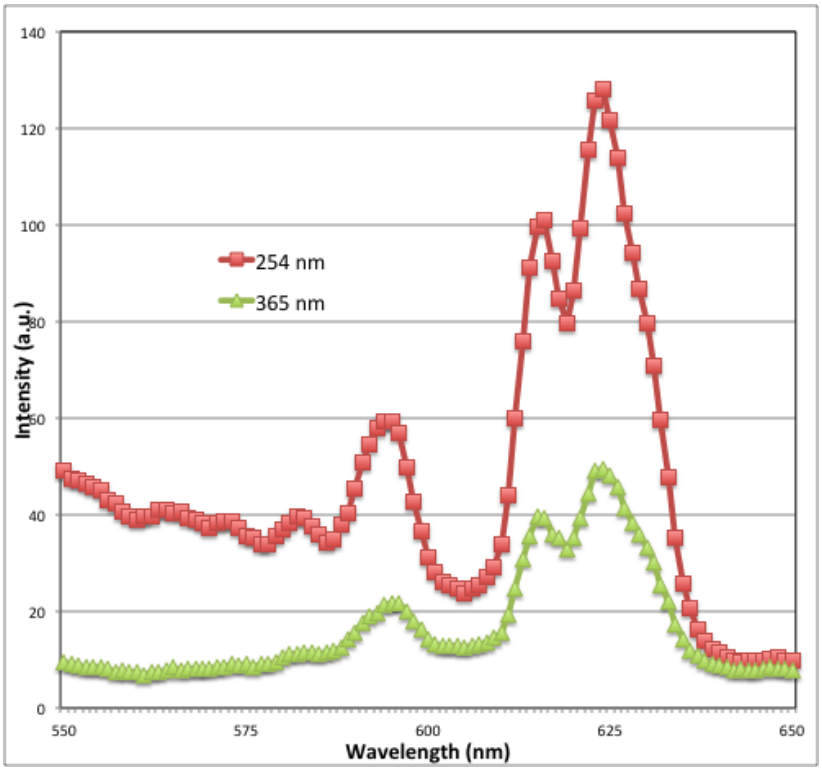


Figure S3. PL spectra of the $Gd_2O_3:Eu^{3+}$ nanoparticles at 254 nm and 365 nm excitation showing identical emission bands of the same shapes and positions, however relative emission intensity upon 254 nm is stronger.

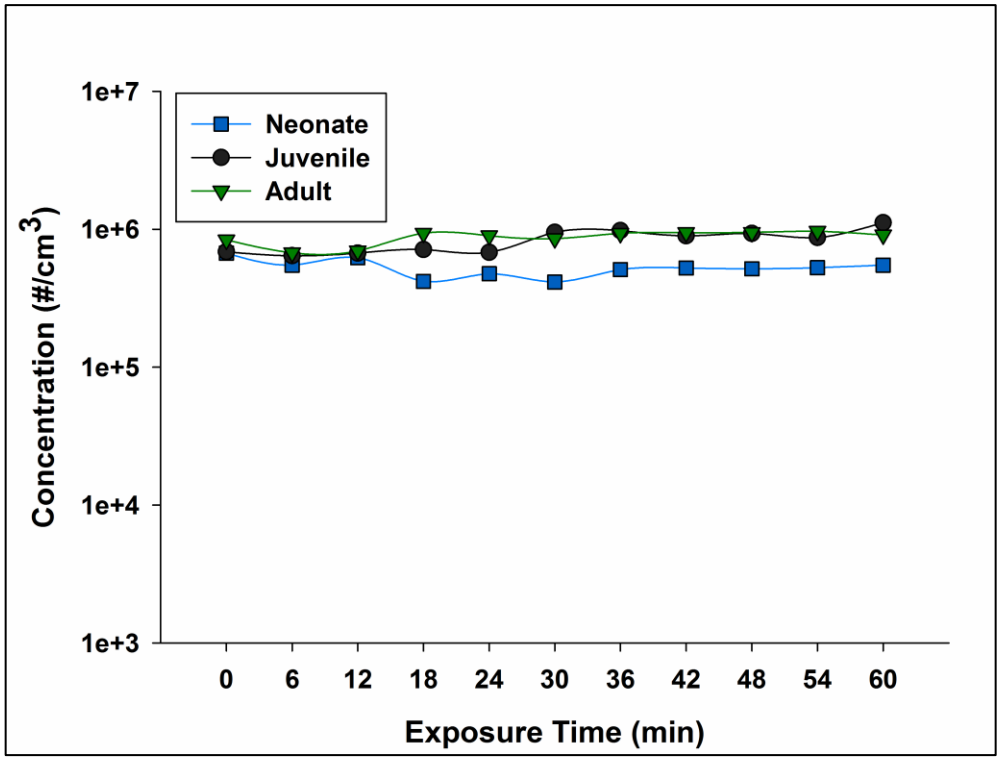


Figure S4. Particle number concentration during the duration of exposure using SMPS.