ELECTRONIC SUPPLEMENTARY INFORMATION

Hydrothermal Synthesis and Structural Characterization of Several Complex Rare Earth Tantalates: $Ln_2TaO_5(OH)$ (*Ln* = La, Pr) and $Ln_3Ta_2O_9(OH)$ (*Ln* = Pr, Nd)

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Table SI 1: EDX data of $Ln_2TaO_5(OH)$ (*Ln* = La, Pr) and $Ln_3Ta_2O_9(OH)$ (*Ln* = Pr, Nd) series of compounds.

Figure SI 1: IR spectra of $Ln_2TaO_5(OH)$ (*Ln* = La, Pr) and $Ln_3Ta_2O_9(OH)$ (*Ln* = Pr, Nd) series of compounds.

Figure SI 2: Absorption spectra of (a) $Pr_3Ta_2O_9(OH)$ and (b) $Nd_3Ta_2O_9(OH)$ in the visible region.

Figure SI 3. Absorption spectra of (a) $Pr_3Ta_2O_9(OH)$ and (b) $Nd_3Ta_2O_9(OH)$ extending into the UV region.

Table SI 1: EDX data of $Ln_2TaO_5(OH)$ (*Ln* = La, Pr) and $Ln_3Ta_2O_9(OH)$ (*Ln* = Pr, Nd) series of compounds.

$La_2NbO_5(OH)$		$La_2TaO_5(OH)$		$Pr_2TaO_5(OH)$		$Pr_3Ta_2O_9(OH)$		$Nd_3Ta_2O_9(OH)$	
Element	Atomic %	Element	Atomic %	Element	Atomic %	Element	Atomic %	Element	Atomic %
La	20.8	La	20.2	Pr	20.1	Pr	19.8	Nd	19.1
Nb	11.3	Ta	11.6	Ta	11.7	Ta	12.9	Ta	13.1
O	67.9	O	68.2	O	67.2	O	67.3	O	67.8

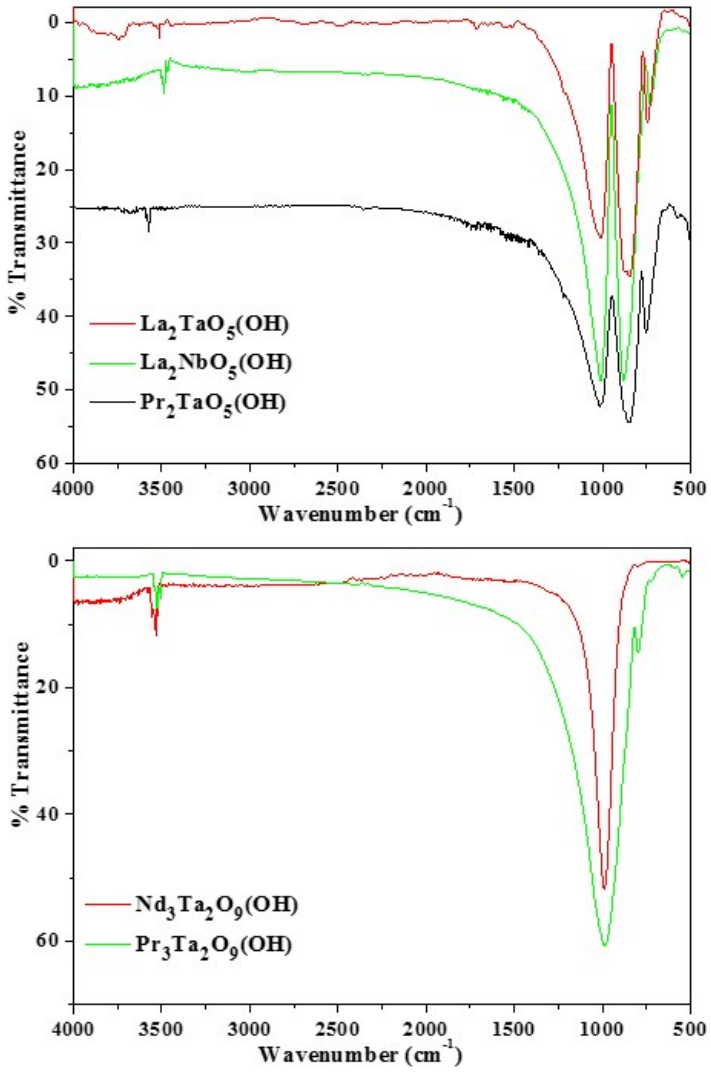

Figure SI 1: IR spectra of $Ln_2TaO_5(OH)$ (*Ln* = La, Pr) and $Ln_3Ta_2O_9(OH)$ (*Ln* = Pr, Nd) series of compounds.

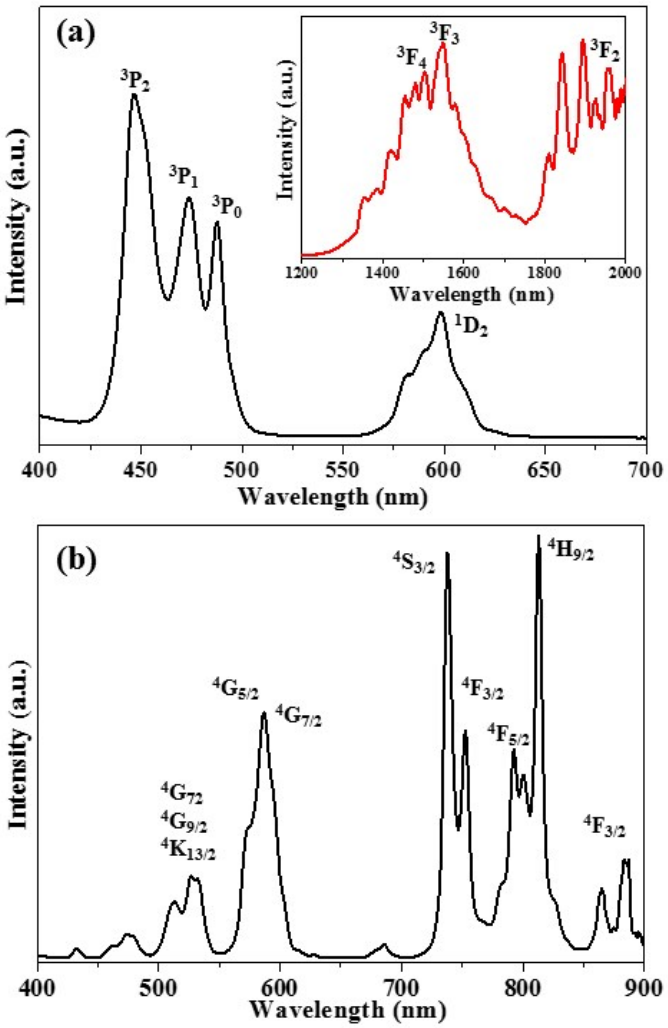

Figure SI 2. Absorption spectra of (a) $Pr_3Ta_2O_9(OH)$ and (b) $Nd_3Ta_2O_9(OH)$.

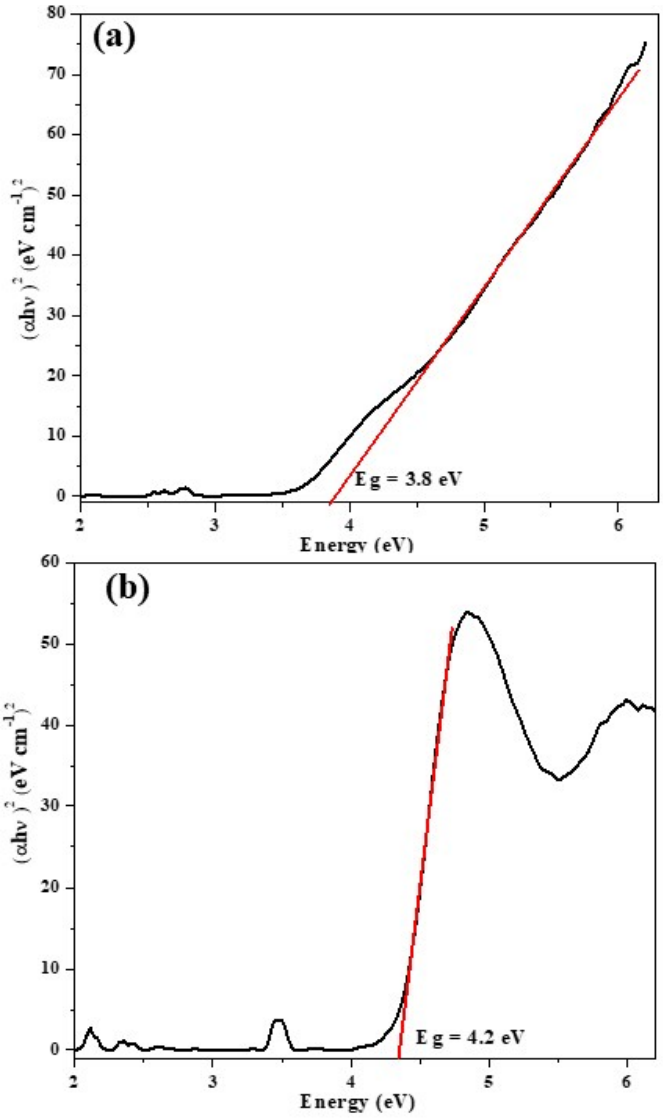

Figure SI 3. Absorption spectra of (a) $Pr_3Ta_2O_9(OH)$ and (b) $Nd_3Ta_2O_9(OH)$ extending into the UV region.