



**Figure SF1.** Flow chart of the synthesis of  $\text{Ag}_{3(2+x)}\text{Pr}_x\text{Nb}_{4-x}\text{O}_{11+\delta}$   
( $0.0 \leq x \leq 1.0$ ) (S1-S3) nanoparticles

Table ST1. The calculated amount precursors of  $\text{Ag}_3(2+x)\text{Pr}_x\text{Nb}_4-x\text{O}_{11+\delta}$  (0.0, 0.25 and 1.0) (S1-S3) nanoparticles.

Sample code	Compositional formula	Starting materials		
		$\text{AgNO}_3$ (g)	$\text{Pr}_6\text{O}_{11}$ (g)	$\text{Nb}_2\text{O}_5$ (g)
S1	$\text{Ag}_6\text{Nb}_4\text{O}_{11}$	4.2651	-	2.2246
S2	$\text{Ag}_{7.5}\text{Pr}_{0.5}\text{Nb}_{3.5}\text{O}_{11+\delta}$	2.9299	0.3082	1.6845
S3	$\text{Ag}_9\text{Pr}_1\text{Nb}_3\text{O}_{11+}$	3.0988	0.5433	1.2725