Supporting Information for

Tuning the Photocatalytic Activity of Layered perovskites Niobates by Controlled Ion Exchange and Hydration

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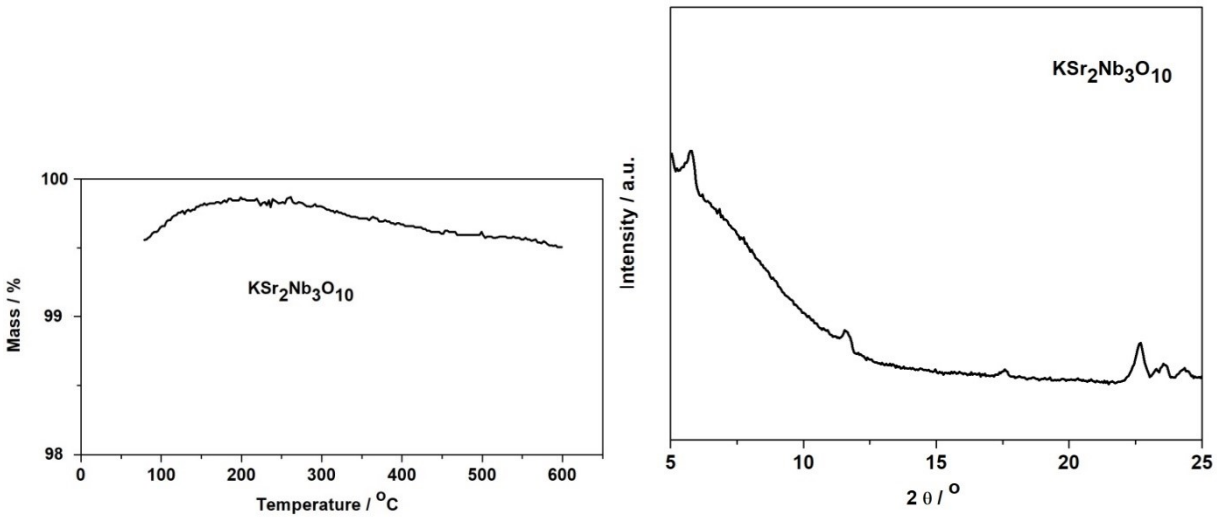
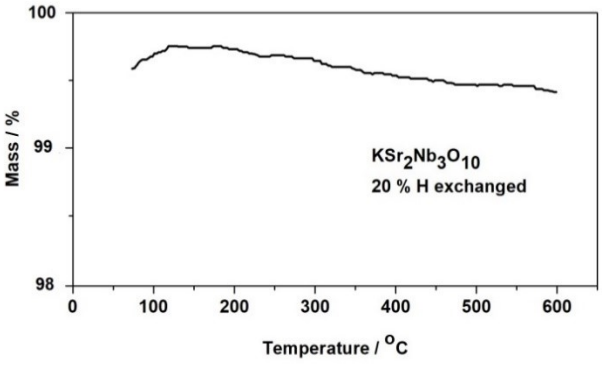
Results and Discussion

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Mass / %
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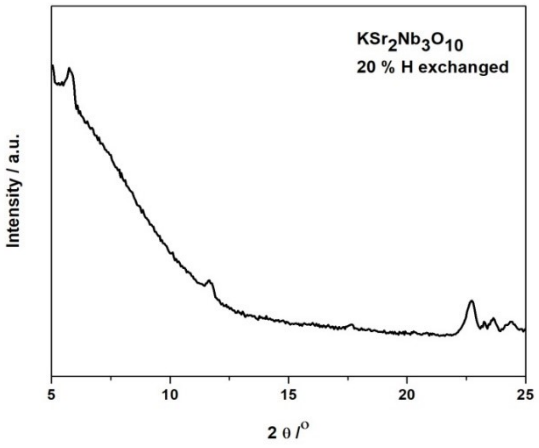
Temperature / °C
KSr2Nb3O10
20 % H exchanged


KSr2Nb3O10
20 % H exchanged
Intensity / a.u.
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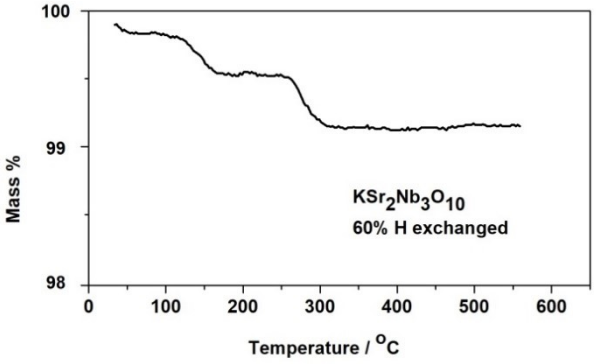
2 θ / °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Mass %
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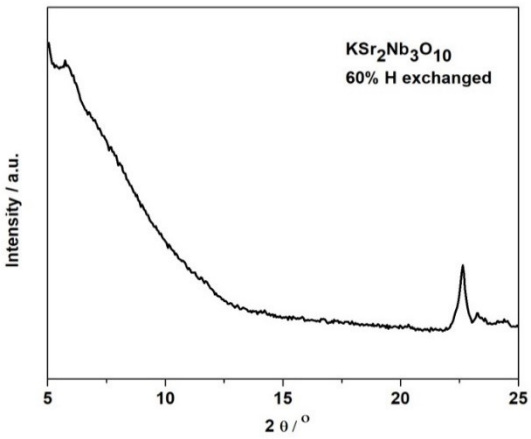
Temperature / °C
KSr2Nb3O10
60% H exchanged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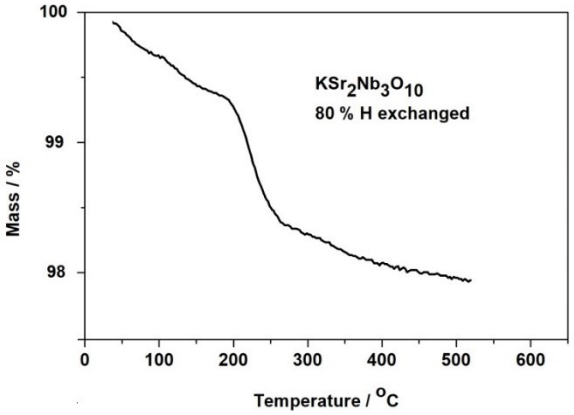
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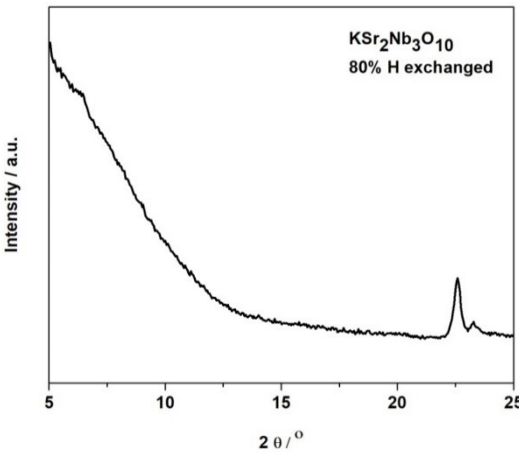
Temperature / °C
KSr2Nb3O10
80 % H exchanged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Intensity / a.u.
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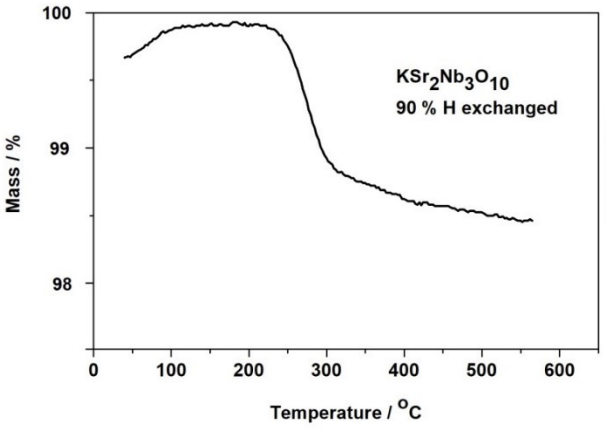
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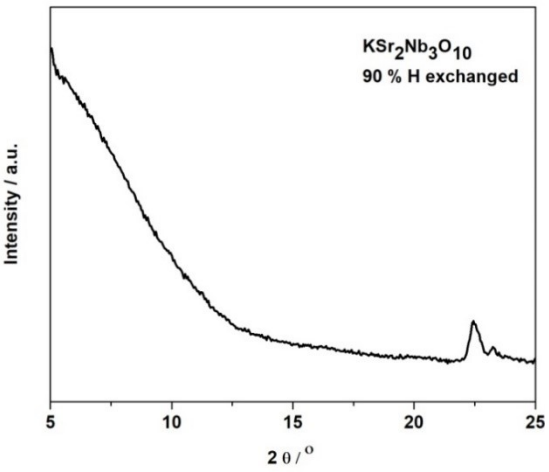
Temperature / ^{O}C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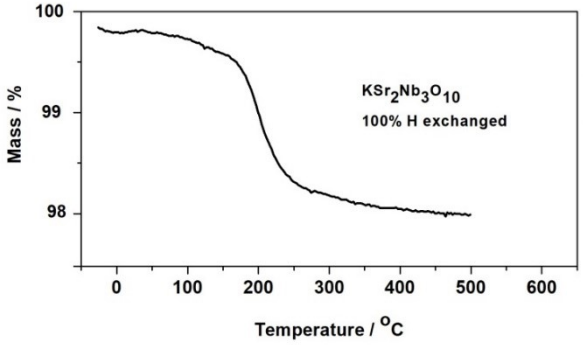
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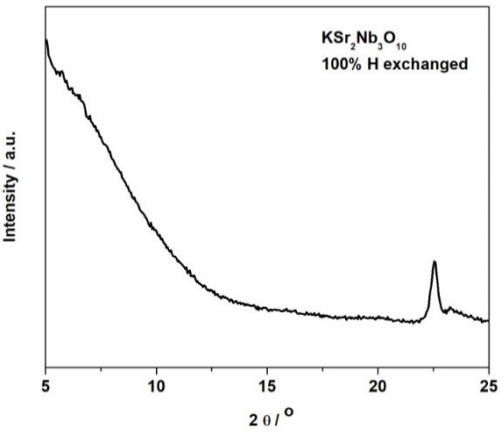
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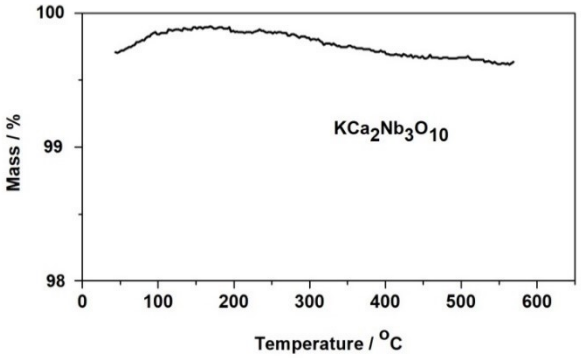
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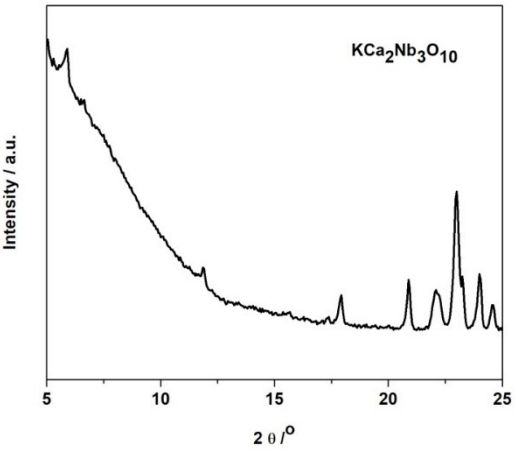
Mass / %
$KCa_2Nb_3O_{10}$
0
100
200
300
400
500
600
Temperature / ^{O}C


$KCa_2Nb_3O_{10}$
Intensity / a.u.
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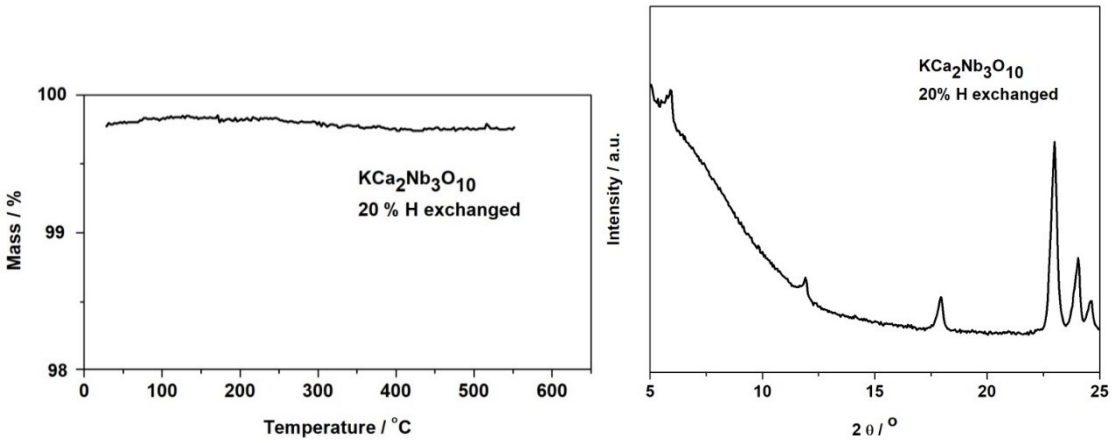
25
2 θ / ^{O}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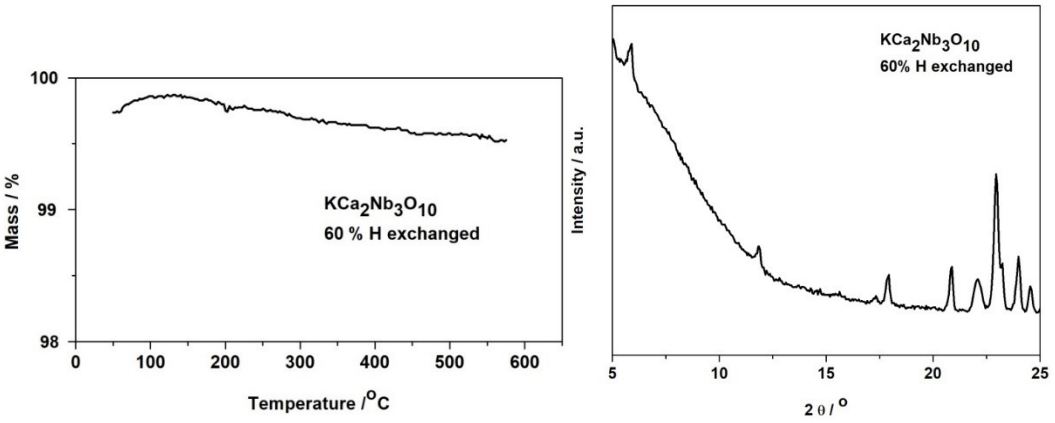
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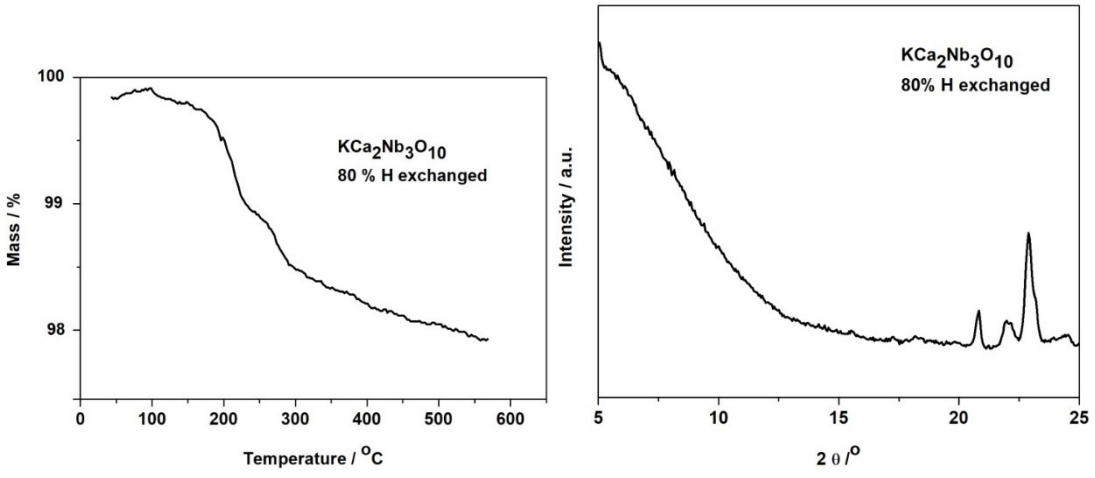
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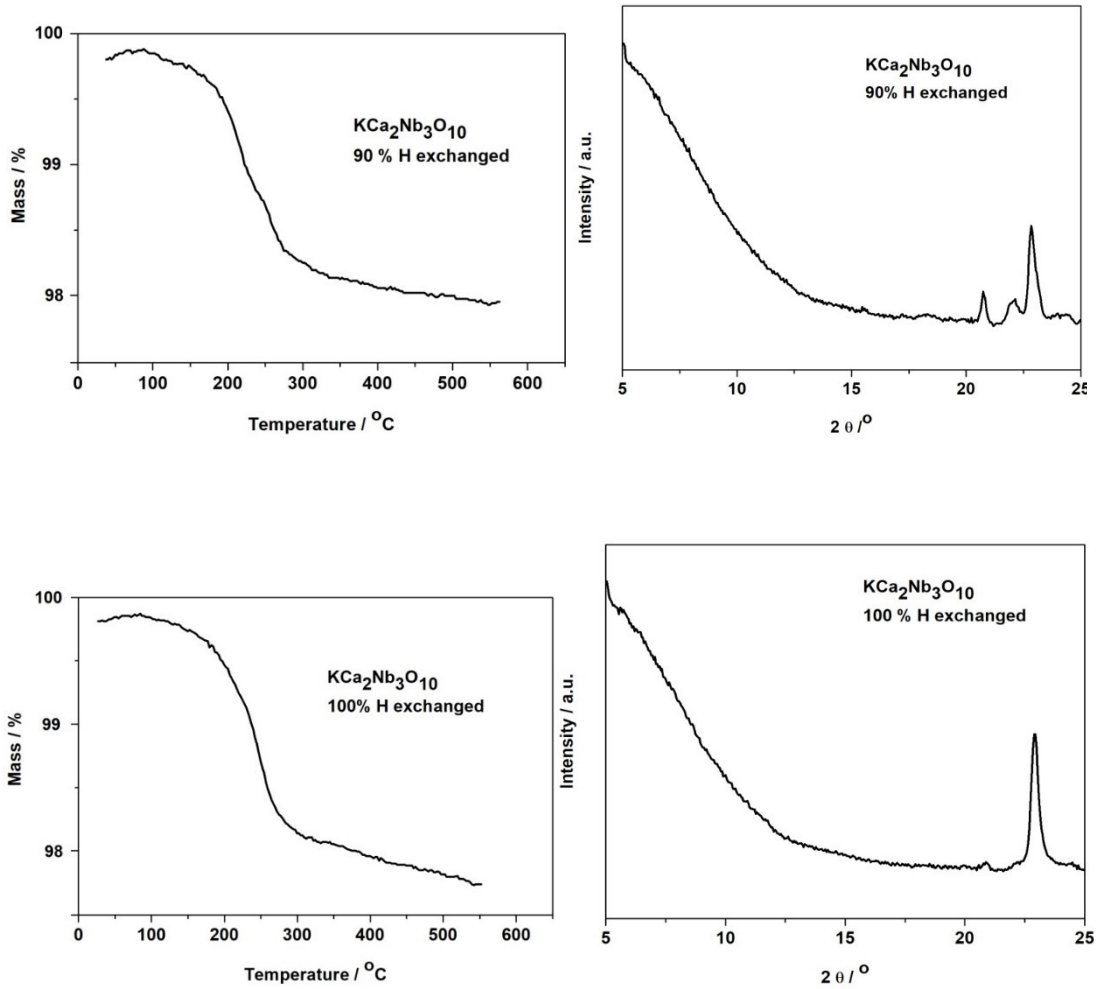

Figure S1: TGA (always left) and XRD patterns (always right) of indicated proton exchanged compounds

Table S1: Averaged atomic compositions of the niobium oxide compounds before and after proton exchange. Stirring of the compounds in 1M HNO_3 at room temperature for 30 min causes a proton exchange of 60 %. Heating the mixture up to 60 °C and stirring for 1 h results in 80 % exchange. Higher degree and the completion of exchange is achieved by stirring the mixture up to 18 h with intermediate solution exchange after every 3h.

degree of exchange	K	atomic % sigma	Sr	atomic % sigma	Nb	atomic % sigma
0 %	0.91	0.01	1.99	0.03	3	0.06
20 %	0.83	0.02	1.96	0.04	3	0.07
60 %	0.40	0.01	1.68	0.03	3	0.06
80 %	0.23	0.01	1.91	0.04	3	0.06
90 %	0.10	0.01	1.93	0.02	3	0.03
100 %	0.02	0.01	1.84	0.02	3	0.03
degree of exchange	**K**	**atomic % sigma**	**Ca**	**atomic % sigma**	**Nb**	**atomic % sigma**
0 %	0.93	0.05	1.83	0.05	3	0.09
20 %	0.80	0.02	2.09	0.04	3	0.08
60 %	0.39	0.02	2.03	0.02	3	0.05
80 %	0.23	0.02	1.86	0.02	3	0.05
90 %	0.13	0.05	1.88	0.04	3	0.05
100 %	0.02	0.01	1.97	0.02	3	0.05

Table S2: Water adsorption data for bulk and proton exchanged compounds.

Degree of proton exchange (%)	$KSr_2Nb_3O_{10}$		$KCa_2Nb_3O_{10}$	
	Adsorbed water (cm^3/g)	Water remaining after desorption (cm^3/g)	Adsorbed water (cm^3/g)	Water remaining after desorption (cm^3/g)
0	1.0	0.1	18.9	3.8
20	5.3	1.0	23.6	5.9
60	37.8	9.9	42.6	12.2
80	45.9	12.1	40.0	7.4
90	6.4	2.5	39.9	9.1
100	5.3	1.7	26.1	7.4

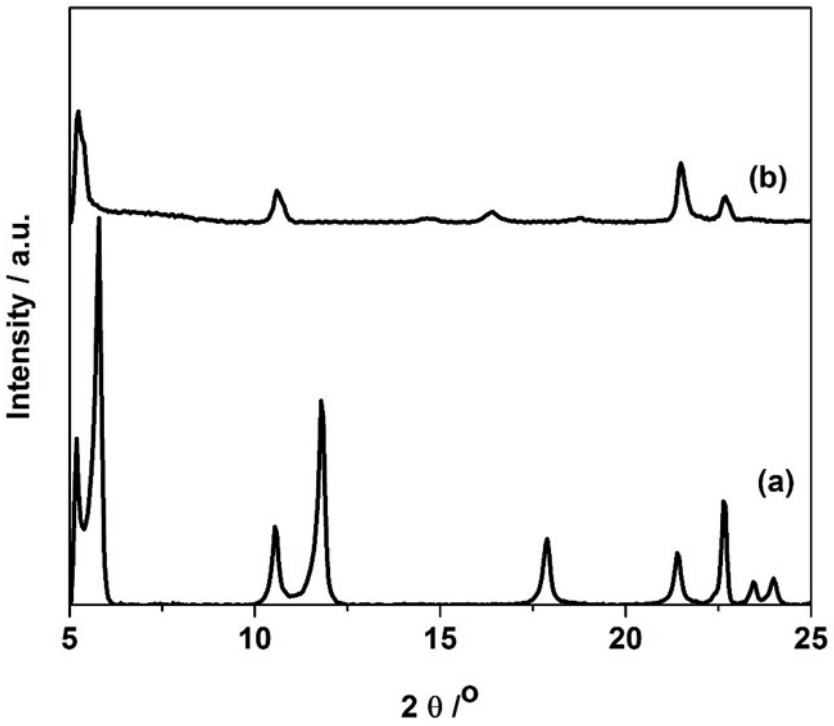

Figure S2: XRD patterns of $HSr_2Nb_3O_{10}$ before (a) and after (b) photocatalysis.

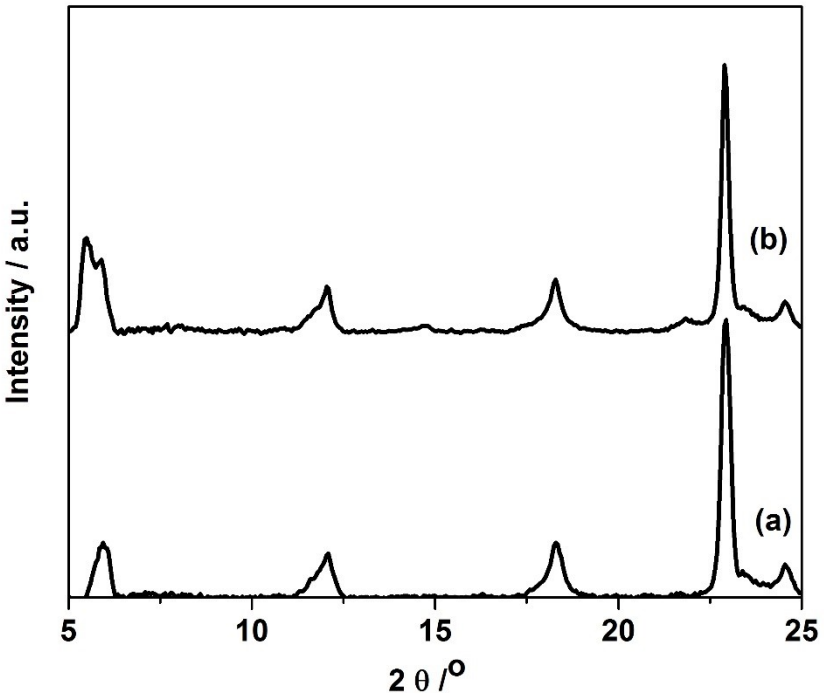

Figure S3: XRD patterns of $HCa_2Nb_3O_{10}$ before (a) and after (b) photocatalysis.