Supporting Information

New Insights into the Synthesis of Sillén–Aurivillius Oxyhalides: Molten Salt induces Interlayer Halogen Competing Reaction

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Figure Captions

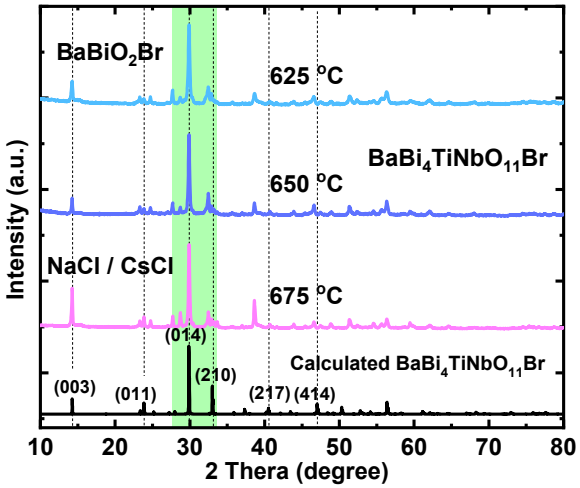

Figure S1. XRD patterns of $BaBi_4TiNbO_{11}Br$ sample calcined from MSS at the temperature range of 625 - 675 °C for 12 h

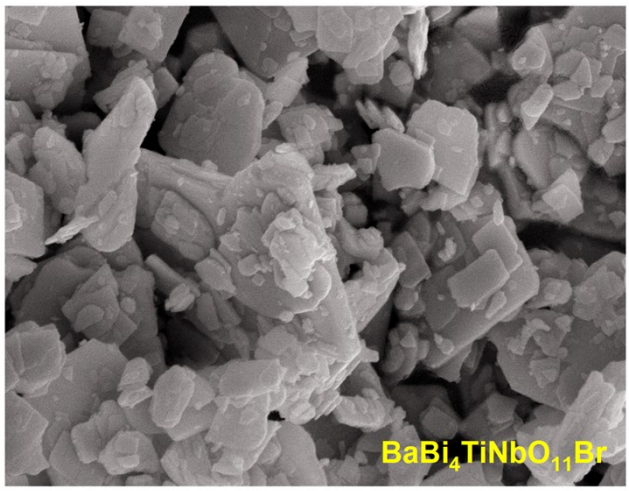

Figure S2. SEM image of $BaBi_4TiNbO_{11}Br$ at the calcination temperature of 650 °C.

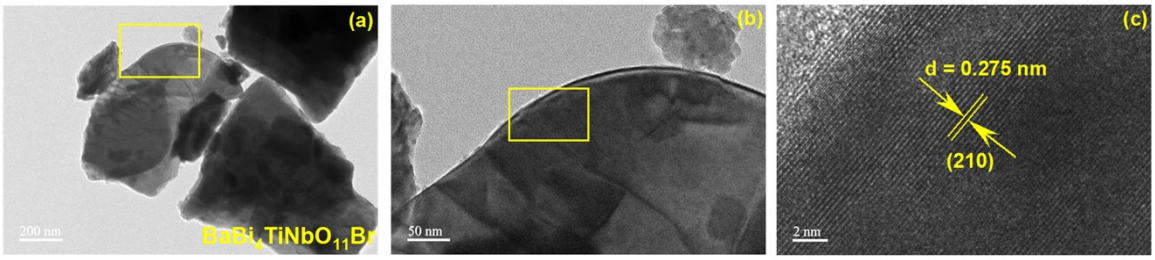

Figure S3. (a) TEM and (b, c) HRTEM images of $BaBi_4TiNbO_{11}Br$. in (c).

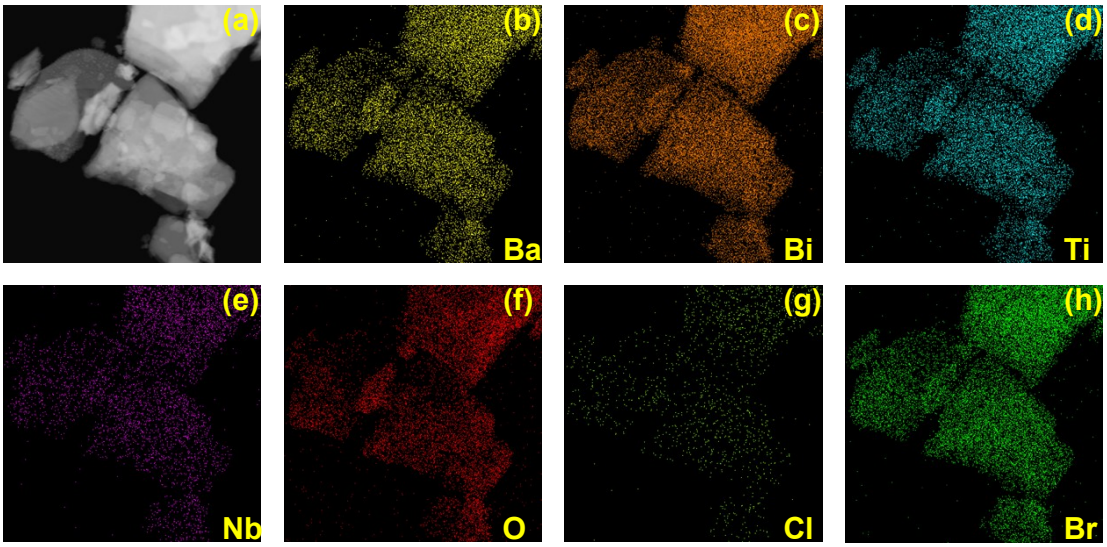

Figure S4. (a) TEM images of $BaBi_4TiNbO_{11}Br$. The corresponding TEM-EDS elemental mappings of (b) Ba, (c) Bi, (d) Ti, (e) Nb, (f) O, (g) Br, and (h) Cl.

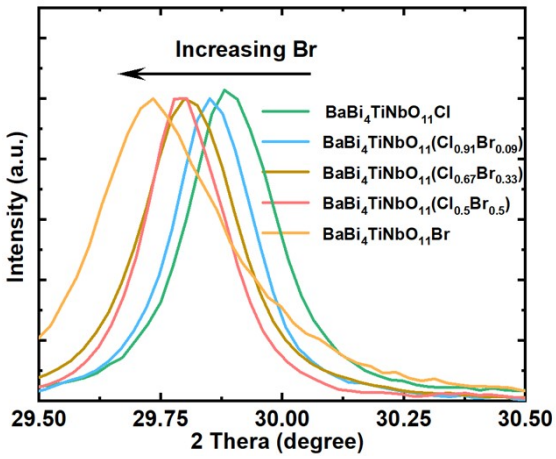

Figure S5. XRD patterns of $BaBi_4TiNbO_{11}(Cl_{1-x}Br_x)$ with different Br content.

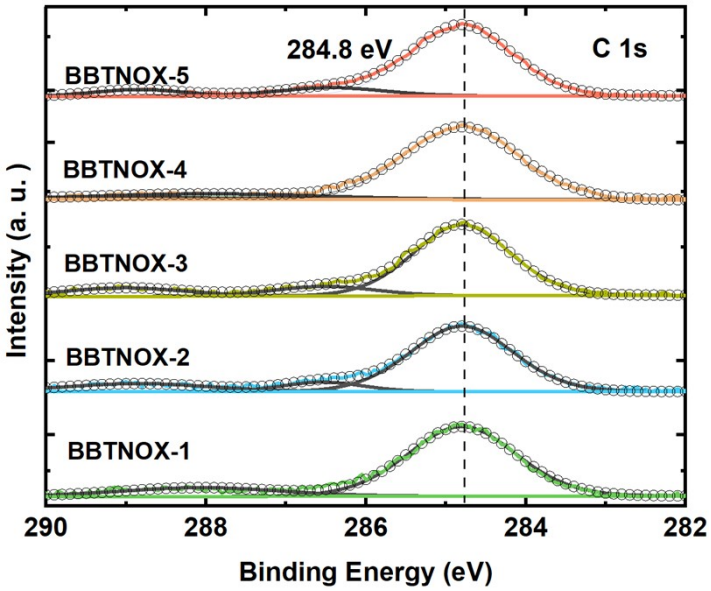

Figure S6. XPS peaks of the C-1*s* core levels.

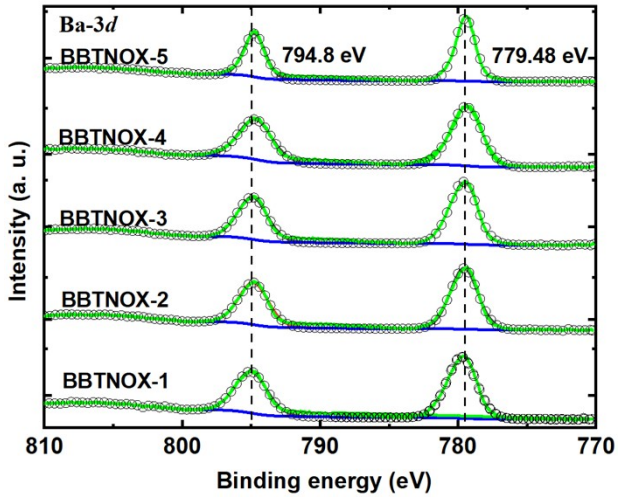

Figure S7. XPS peaks of the Ba-3*d* core levels.

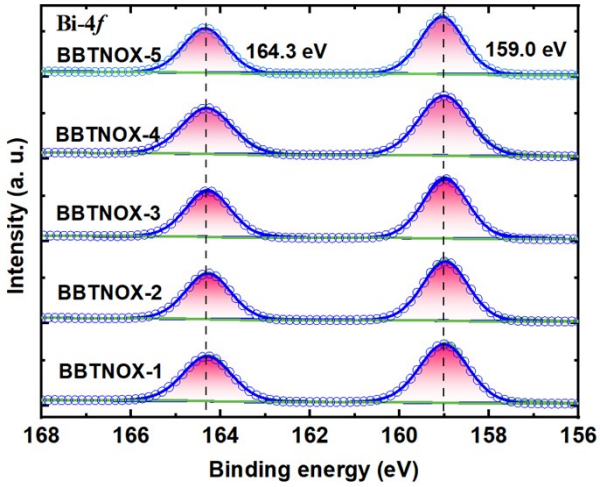

Figure S8. XPS peaks of the Bi-4*f* core levels.

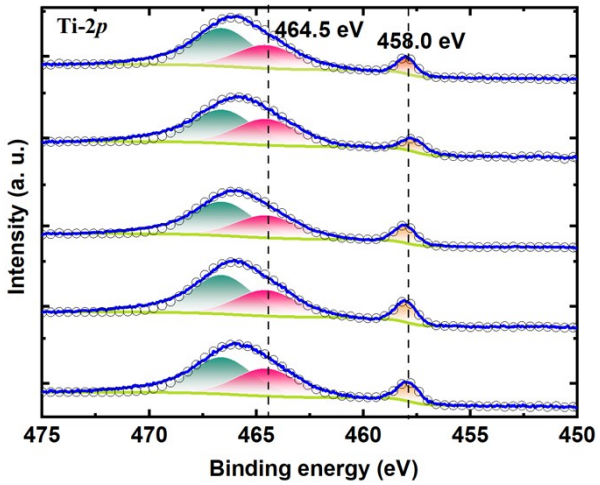

Figure S9. XPS peaks of the Ti-2*p* core levels.

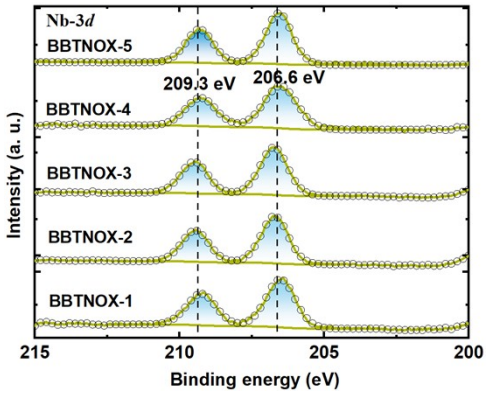

Figure S10. XPS peaks of the Nb-3*d* core levels.

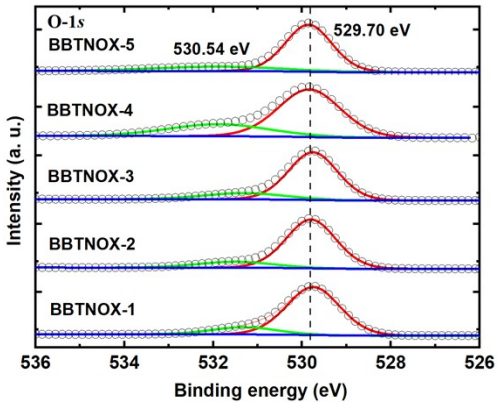

Figure S11. XPS peaks of the O-1*s* core levels.

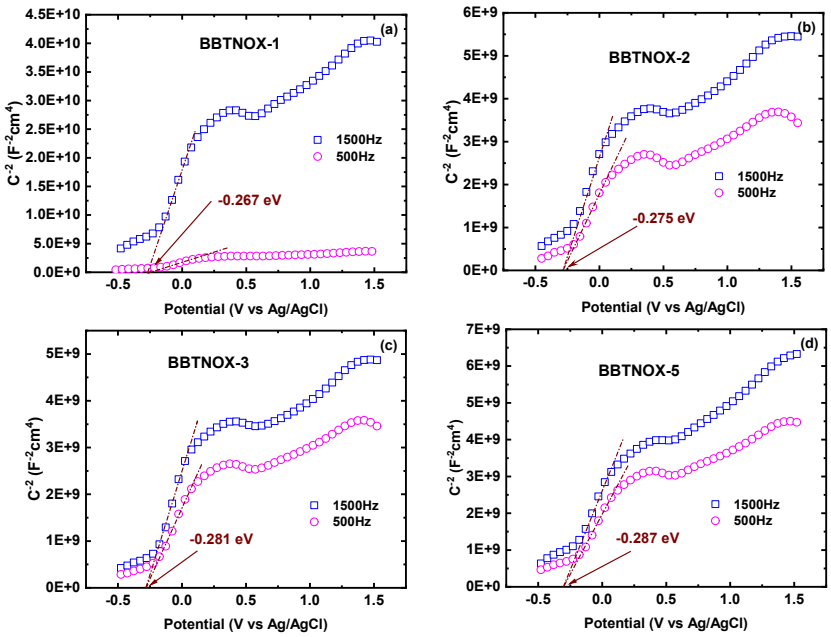

Figure S12. Mott-Schottky curves of (a) $BaBi_4TiNbO_{11}Cl$, (b) $BaBi_4TiNbO_{11}(Cl_{0.91}Br_{0.09})$, (c) $BaBi_4TiNbO_{11}(Cl_{0.67}Br_{0.33})$, and (d) $BaBi_4TiNbO_{11}Br$.

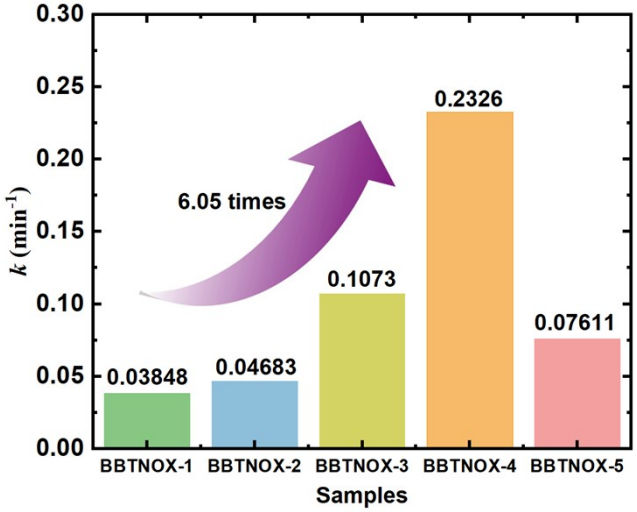

Figure S13. The corresponding *k* values of samples.

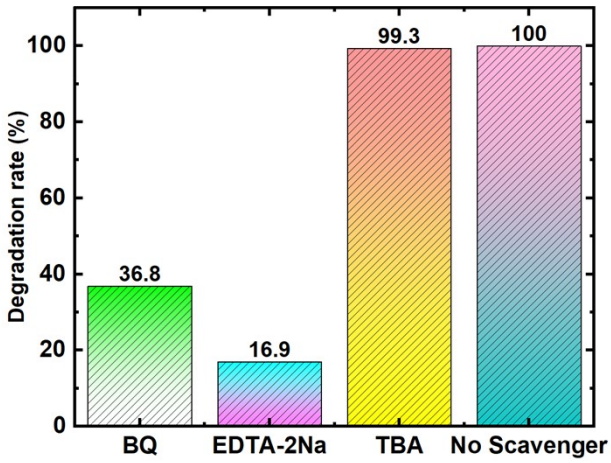

Figure S14. The degradation rate of RhB over BaBi4TiNbO11($Cl_{0.5}Br_{0.5}$) with the addition of BQ, EDTA-2Na, and TBA.

Table Captions

Table S1. Components of halogen oxide materials from TEM-EDS in Figure S4.

Element	Line Type	k Factor	k Factor type	Absorption Correction	Wt%	Wt% Sigma	Atomic %
O	K series	2.020		1.00	8.04	0.18	44.07
Cl	K series	1.026		1.00	2.78	0.13	6.87
Ti	K series	1.090		1.00	3.53	0.11	6.46
Br	K series	1.801		1.00	0.41	0.07	0.45

Nb	K series	3.857		1.00	6.85	0.21	6.47
Ba	L series	2.056		1.00	12.67	0.27	8.09
Bi	L series	2.469		1.00	65.73	0.34	27.59
Total:					100.00		100.00