

Supporting Information

New Selenites: Hydrothermal Syntheses, Crystal Structures, and Characterization of $\text{Rb}_3\text{HGa}_2(\text{OH})_2(\text{SeO}_3)_4$, $\text{Rb}_3\text{Ga}_5(\text{SeO}_3)_8(\text{HSeO}_3)_2 \cdot 0.5\text{H}_2\text{O}$, and $\text{RbGa}(\text{SeO}_3)_2 \cdot \text{H}_2\text{O}$

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S1. Experimental and calculated powder X-ray diffraction patterns for $\text{Rb}_3\text{HGa}_2(\text{OH})_2(\text{SeO}_3)_4$

S2. Experimental and calculated powder X-ray diffraction patterns for $\text{Rb}_3\text{Ga}_5(\text{SeO}_3)_8(\text{HSeO}_3)_2 \cdot 0.5\text{H}_2\text{O}$

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S4. Thermogravimetric analysis diagram and PXRD patterns at different temperatures for $\text{Rb}_3\text{HGa}_2(\text{OH})_2(\text{SeO}_3)_4$

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S8. IR spectrum for $\text{Rb}_3\text{HGa}_2(\text{OH})_2(\text{SeO}_3)_4$

S9. IR spectrum for $\text{Rb}_3\text{Ga}_5(\text{SeO}_3)_8(\text{HSeO}_3)_2 \cdot 0.5\text{H}_2\text{O}$

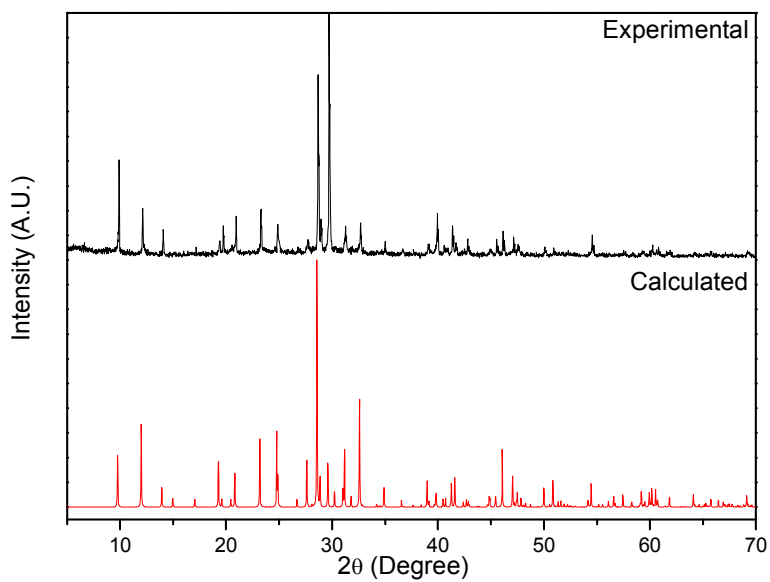
S10. IR spectrum for $\text{RbGa}(\text{SeO}_3)_2 \cdot \text{H}_2\text{O}$

S11. Powder X-ray diffraction patterns of the product of the ion exchange of $\text{RbGa}(\text{SeO}_3)_2 \cdot \text{H}_2\text{O}$ with H^+ and K^+ cations

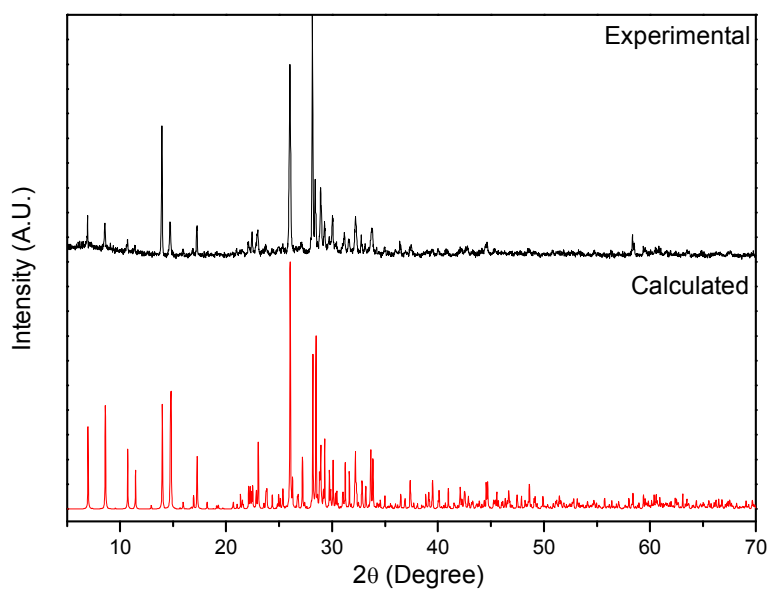
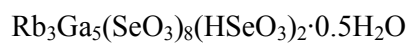
S12. Selected bond distances (Å) for $\text{Rb}_3\text{HGa}_2(\text{OH})_2(\text{SeO}_3)_4$, $\text{Rb}_3\text{Ga}_5(\text{SeO}_3)_8(\text{HSeO}_3)_2 \cdot 0.5\text{H}_2\text{O}$, and $\text{RbGa}(\text{SeO}_3)_2 \cdot \text{H}_2\text{O}$

S13. Summary of the dipole moments for SeO_3 polyhedra (D = Debyes)

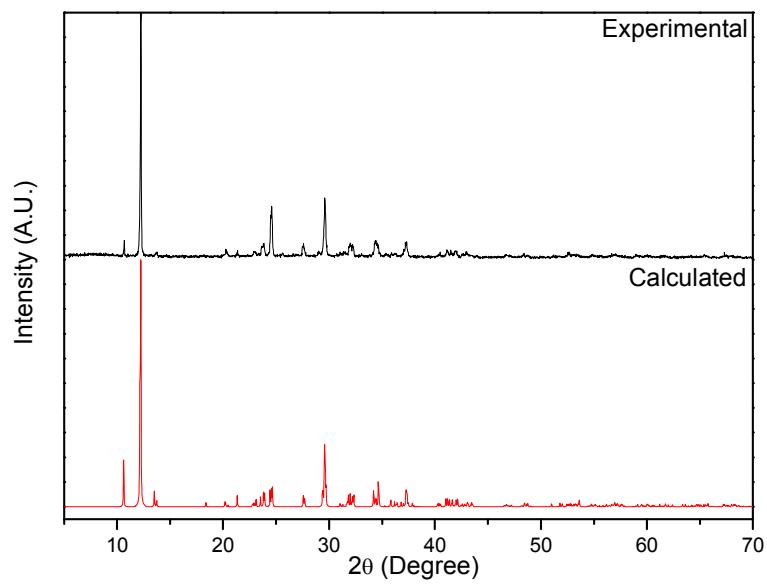
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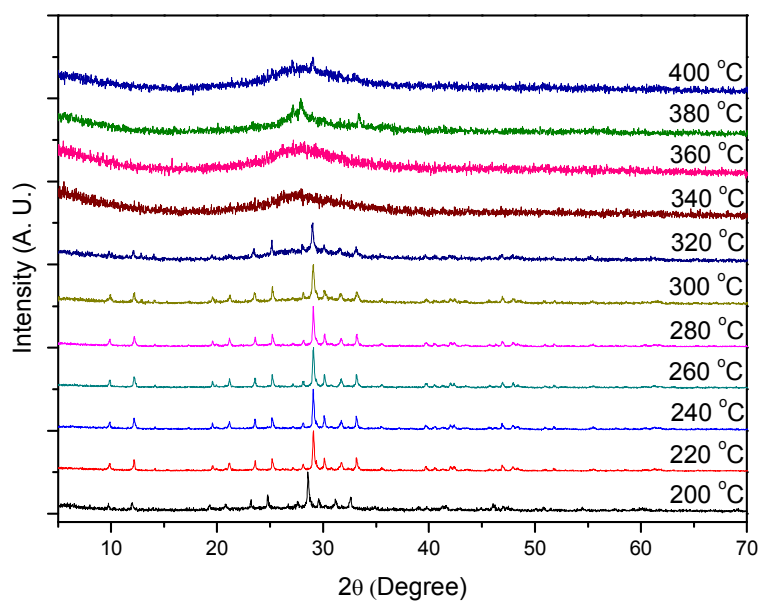
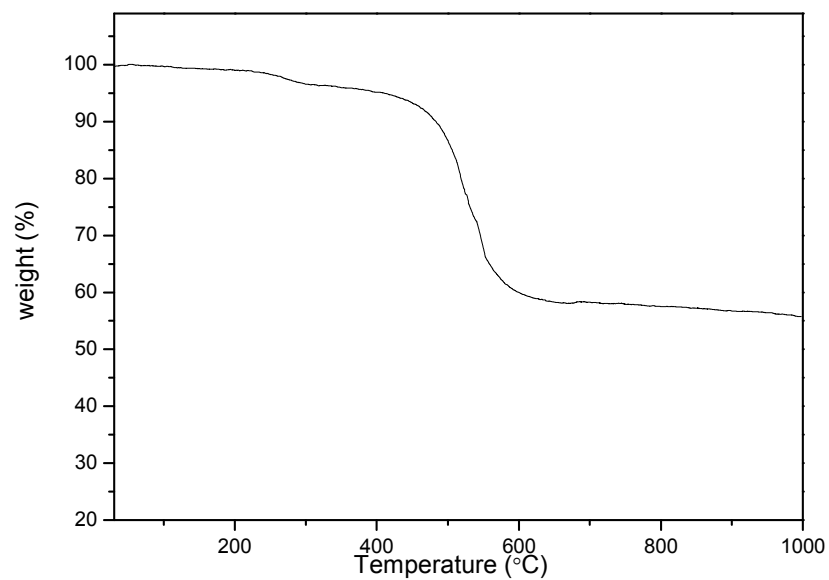
S2. Experimental and calculated powder X-ray diffraction patterns for



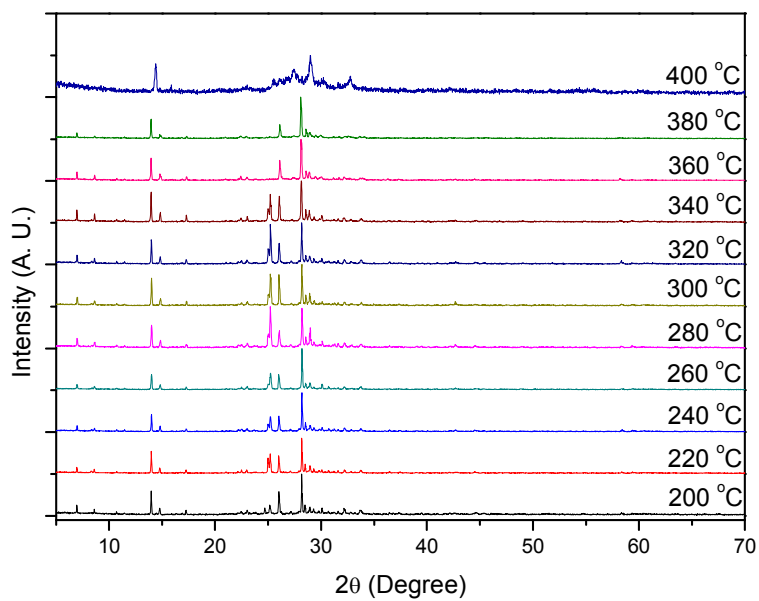
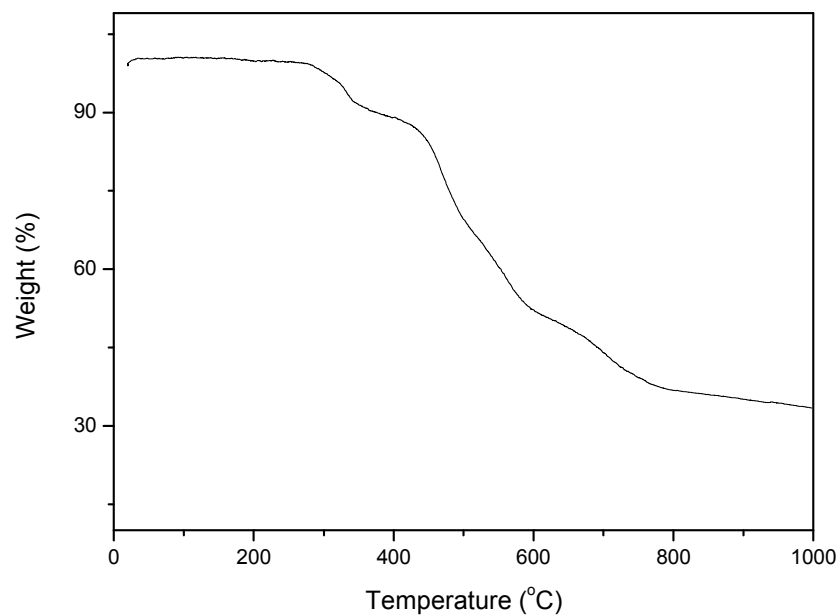
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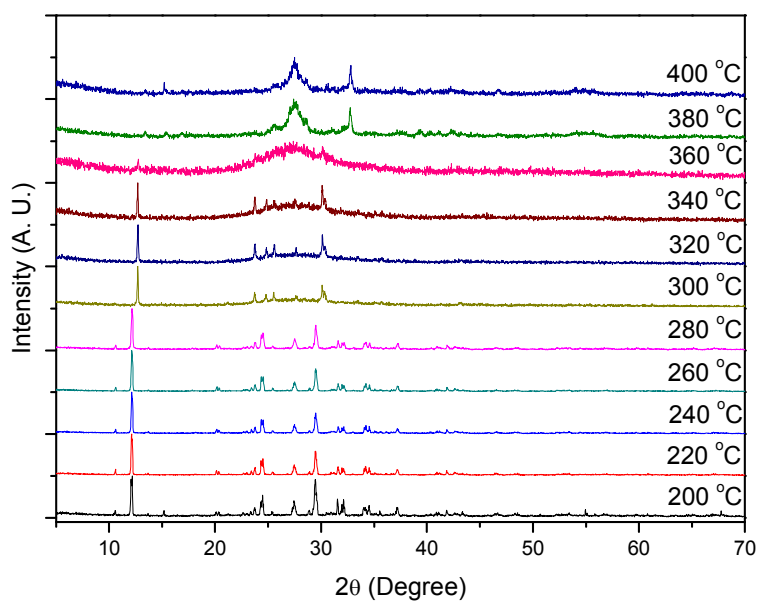
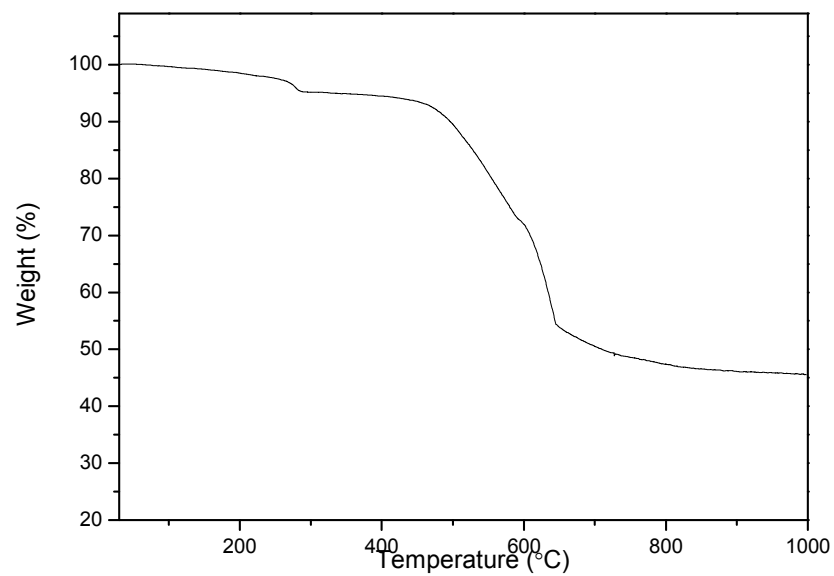
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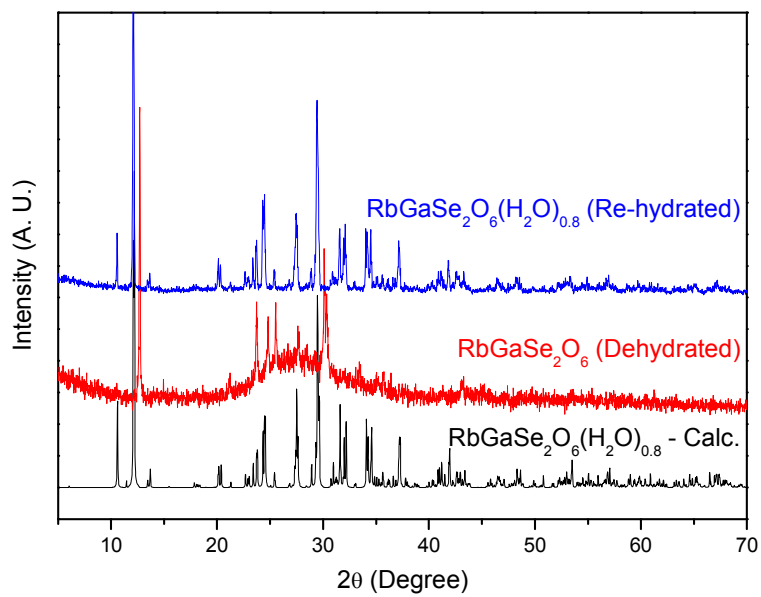
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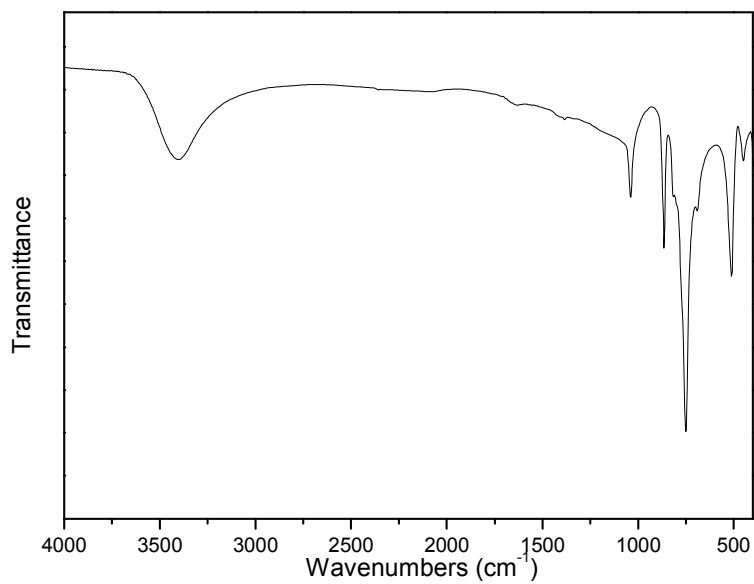
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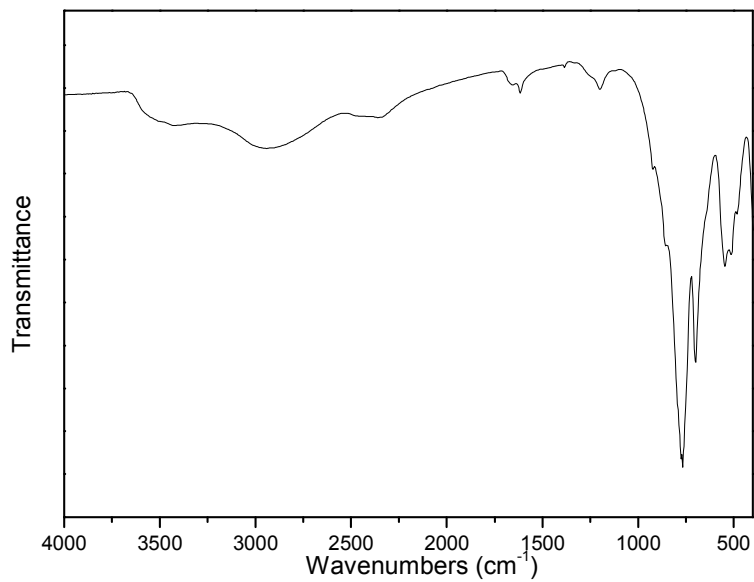
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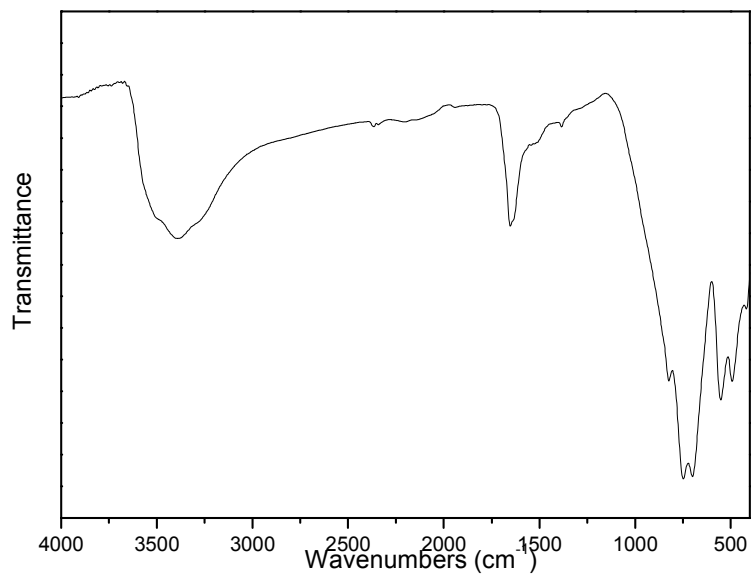
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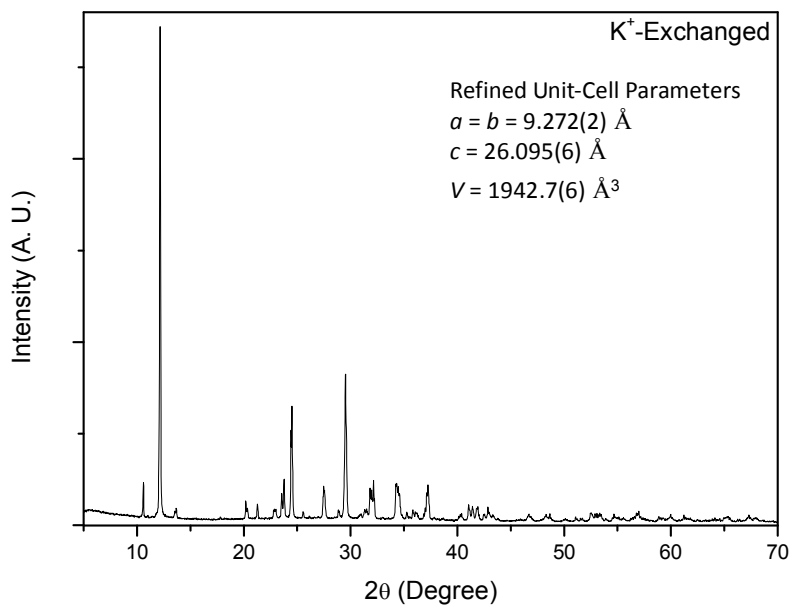
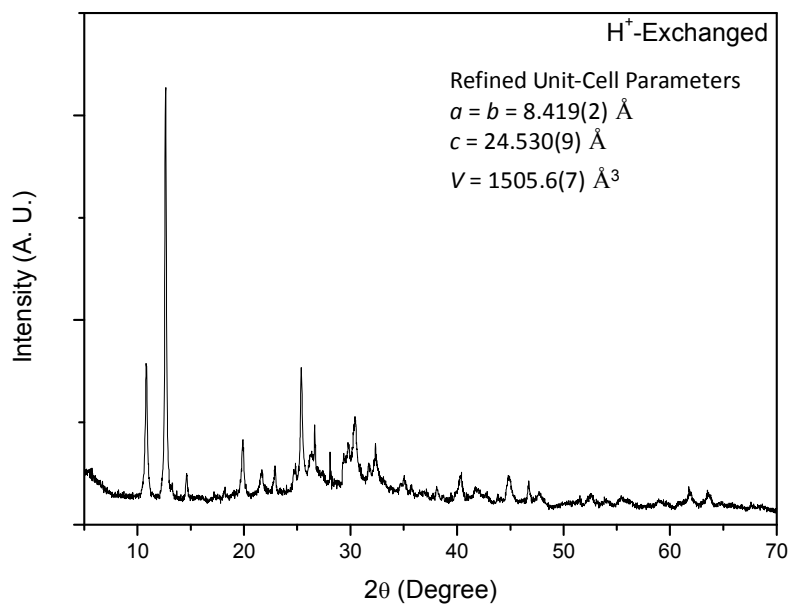
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$\text{Rb}_3\text{HGa}_2(\text{OH})_2(\text{SeO}_3)_4$		$\text{Rb}_3\text{Ga}_5(\text{SeO}_3)_8(\text{HSeO}_3)_2 \cdot 0.5\text{H}_2\text{O}$				$\text{RbGa}(\text{SeO}_3)_2 \cdot \text{H}_2\text{O}$			
Ga(1)–O(1) × 2	1.963(3)	Ga(1)–O(3)	1.842(5)	Se(1)–O(1)	1.668(5)	Ga(1)–O(1)	1.978(4)	Se(1)–O(1)	1.715(4)
Ga(1)–O(2) × 2	1.9605(18)	Ga(1)–O(4)	1.846(5)	Se(1)–O(2)	1.678(5)	Ga(1)–O(6)	1.960(4)	Se(1)–O(2)	1.700(4)
Ga(1)–O(3) × 2	2.023(3)	Ga(1)–O(12)	1.833(5)	Se(1)–O(3)	1.729(5)	Ga(1)–O(9)	1.988(5)	Se(1)–O(3)	1.704(4)
Se(1)–O(1) × 2	1.705(3)	Ga(1)–O(18)	1.845(5)	Se(2)–O(4)	1.727(5)	Ga(1)–O(14)	2.013(4)	Se(2)–O(4)	1.709(4)
Se(1)–O(5)	1.653(5)	Ga(2)–O(2)	1.984(5)	Se(2)–O(5)	1.682(5)	Ga(1)–O(17)	1.981(4)	Se(2)–O(5)	1.703(4)
Se(2)–O(3) × 2	1.691(3)	Ga(2)–O(5)	1.970(5)	Se(2)–O(6)	1.679(5)	Ga(1)–O(18)	1.976(4)	Se(2)–O(6)	1.686(4)
Se(2)–O(4)	1.707(5)	Ga(2)–O(13)	1.947(5)	Se(3)–O(7)	1.692(5)	Ga(2)–O(3)	1.998(4)	Se(3)–O(7)	1.700(4)
		Ga(2)–O(21)	1.963(5)	Se(3)–O(8)	1.675(5)	Ga(2)–O(4)	1.984(4)	Se(3)–O(8)	1.706(4)
		Ga(2)–O(25)	1.994(5)	Se(3)–O(9)	1.717(5)	Ga(2)–O(7)	1.974(4)	Se(3)–O(9)	1.689(4)
		Ga(2)–O(29)	2.015(5)	Se(4)–O(10)	1.688(5)	Ga(2)–O(10)	1.997(4)	Se(4)–O(10)	1.699(4)
		Ga(3)–O(6)	1.970(5)	Se(4)–O(11)	1.682(5)	Ga(2)–O(12)	1.977(4)	Se(4)–O(11)	1.705(4)
		Ga(3)–O(7)	1.982(5)	Se(4)–O(12)	1.737(5)	Ga(2)–O(15)	1.971(4)	Se(4)–O(12)	1.705(4)
		Ga(3)–O(17)	1.938(5)	Se(5)–O(13)	1.692(5)	Ga(3)–O(2)	1.977(4)	Se(5)–O(13)	1.701(4)
		Ga(3)–O(20)	1.938(5)	Se(5)–O(14)	1.689(5)	Ga(3)–O(5)	1.992(4)	Se(5)–O(14)	1.706(4)
		Ga(3)–O(26)	1.971(5)	Se(5)–O(15)	1.693(5)	Ga(3)–O(8)	1.977(4)	Se(5)–O(15)	1.705(4)
		Ga(3)–O(28)	1.988(5)	Se(6)–O(16)	1.673(5)	Ga(3)–O(11)	1.988(4)	Se(6)–O(16)	1.697(4)
		Ga(4)–O(1)	2.002(5)	Se(6)–O(17)	1.667(5)	Ga(3)–O(13)	1.995(4)	Se(6)–O(17)	1.706(4)
		Ga(4)–O(8)	1.969(5)	Se(6)–O(18)	1.722(5)	Ga(3)–O(16)	1.971(4)	Se(6)–O(18)	1.709(4)
		Ga(4)–O(11)	1.975(5)	Se(7)–O(19)	1.698(5)				
		Ga(4)–O(14)	1.996(5)	Se(7)–O(20)	1.697(5)				
		Ga(4)–O(22)	2.002(5)	Se(7)–O(21)	1.678(5)				
		Ga(4)–O(27)	1.938(5)	Se(8)–O(22)	1.657(5)				
		Ga(5)–O(9)	1.970(5)	Se(8)–O(23)	1.644(5)				
		Ga(5)–O(10)	1.956(5)	Se(8)–O(24)	1.755(8)				
		Ga(5)–O(15)	1.943(5)	Se(9)–O(25)	1.685(5)				
		Ga(5)–O(16)	1.932(5)	Se(9)–O(26)	1.688(5)				
		Ga(5)–O(19)	1.941(5)	Se(9)–O(27)	1.678(5)				
		Ga(5)–O(23)	2.016(5)	Se(10)–O(28)	1.678(5)				
				Se(10)–O(29)	1.664(5)				
				Se(10)–O(30)	1.759(5)				

S13. Summary of the dipole moments for SeO_3 polyhedra (D = Debyes)

compound	species	dipole moment (D)
$\text{Rb}_3\text{HGa}_2(\text{OH})_2(\text{SeO}_3)_4$	Se(1) O_3	7.59
	Se(2) O_3	7.35
$\text{Rb}_3\text{Ga}_5(\text{SeO}_3)_8(\text{HSeO}_3)_2 \cdot 0.5\text{H}_2\text{O}$	Se(1) O_3	7.57
	Se(2) O_3	8.02
	Se(3) O_3	8.46
	Se(4) O_3	7.55
	Se(5) O_3	7.71
	Se(6) O_3	8.15
	Se(7) O_3	8.35
	Se(8) O_3	7.51
	Se(9) O_3	7.94
	Se(10) O_3	8.26
$\text{RbGa}(\text{SeO}_3)_2 \cdot \text{H}_2\text{O}$	Se(1) O_3	7.60
	Se(2) O_3	8.47
	Se(3) O_3	8.51
	Se(4) O_3	8.06
	Se(5) O_3	7.76