

Table III. Wavenumber for the librational ( $\nu_6$ ) and Internal modes ( $\nu_1 - \nu_4$ ) of the  $\text{NH}_4^+$  Ion in Various Ammonium Salts (300 K; 1 atm)

Crystal	Crystal Symmetry	Distance (Å)	Barrier Height, $V_0$ (kcal mole <sup>-1</sup> )	$\nu_6$	$\nu_1$	$\nu_2$	$\nu_3$	$\nu_4$ (cm <sup>-1</sup> )	References
<u>FLUORIDE</u>									
		<u>dN-F</u>							
$\text{NH}_4\text{F}$	hex., $\text{C}_{6V}^6$ or $\text{C}_{6V}^4$	2.71	~10	555-568	2845	1750	3100	1408	15, 64-72
$(\text{NH}_4)_2\text{SiF}_6$	Cubic, $\text{O}_h^5$	3.00	~2	168	3233	1701	3314	1427	68, 73-76
$(\text{NH}_4)_2\text{BeF}_4$	Rhomb., $\text{V}_h^{16}$	2.86- 3.39	1.5, 2.7, 4.3		3247	1686 <sup>+</sup>	3334	1431	15, 77, 81
$\text{NH}_4\text{PF}_6$	Cubic, $\text{O}_h^5$		0.2 (103K)		3252		3335	1433	15, 68, 82
<u>CHLORIDE</u>									
		<u>dN-Cl</u>							10, 18, 38, 57
$\text{NH}_4\text{Cl}$	Cubic, $\text{O}_h^1$	3.35	4.7	350	3055	1710	3150	1404(TO)	83-84
$(\text{NH}_4)_2\text{SnCl}_6$	Cubic, $\text{O}_h^5$	3.55	1.2		3162	1670	3245	1407	76-77, 85
$(\text{NH}_4)_2\text{PtCl}_6$	Cubic, $\text{O}_h^5$	3.48					3240		68, 86
<u>BROMIDE</u>									
		<u>dN-Br</u>							10, 18, 38, 57, 83
$\text{NH}_4\text{Br}$	Cubic, $\text{O}_h^1$	3.52	3.3, 4.0	310	3055	1690	3135	1402(TO)	87