Guanidinium hexabromoantimonate(V) [C(NH$_2$)$_3$]SbBr$_6$: Phase Transition and Molecular Motion

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Guanidinium hexabromoantimonate(V) [C(NH$_2$)$_3$]SbBr$_6$ was prepared. It was black in color at room temperature and showed a tendency to turn yellow by losing bromine in open air. Six $^{81}$Br NQR lines were observed at 77 K. On heating, four of the six lines faded out around 200 K, while the remaining two lines could be observed up to room temperature. This temperature behavior suggests a preferential libration or reorientation around a pseudo C$_4$ axis of the octahedral [SbBr$_6$]$^-$ anion. DTA measurement revealed a small heat anomaly at $T_{c1} = 273$ K (on heating), showing a thermal hysteresis, and a sharp and large anomaly at $T_{c2} = 314$ K. The temperature dependence curve of $^1$H NMR $T_1$ is characterized by a single minimum of 26 ms (32 MHz) near 280 K, which is assigned to the C$_3$ reorientation of the planar [C(NH$_2$)$_3$]$^+$ cations. Its activation energy ($E_a$) is $43.3$ kJ/mol.

Key words: [C(NH$_2$)$_3$]SbBr$_6$; Phase Transition; Molecular Motion; $^{81}$Br NQR; $^1$H NMR $T_1$. 