^{133}Cs NMR Spin-Lattice Relaxation Time and Chemical Shift Studies on Cs_2MX_4 Crystals with Sr_2GeS_4 and β-K_2SO_4 Structures Performing no Low Temperature Phase Transition

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^{133}Cs NMR spectra and spin-lattice relaxation times T_1 in crystalline Cs_2ZnCl_4 and Cs_2ZnBr_4 with β-K_2SO_4 structure, and Cs_2CdI_4 and Cs_2HgI_4 with Sr_2GeS_4 structure, which have no phase transition in the lower temperature regions, were measured to clarify the relation between the interionic covalency and crystal structures. Two central lines corresponding to two crystallographically inequivalent Cs sites were observed in all compounds. One of the two peaks in β-K_2SO_4-type compounds appears below 40 ppm, but another peak in those compounds and the both lines in Sr_2GeS_4-type compounds show larger shifts, 130 - 200 ppm. The temperature dependences of T_1 observed in Sr_2GeS_4-type compounds were close to the theoretical behaviour, calculated by considering contributions from normal lattice vibrations. Deviations from the calculation obtained for β-K_2SO_4-type systems are attributable to the difference in interionic interactions, i. e., partial covalency, in the crystals.

Key words: ^{133}Cs NMR; Chemical Shift; T_1; Partial Covalency.