Magnetic Susceptibility Calculated from Correlation-Lengths Derived by Mössbauer Relaxation Spectra

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From the knowledge of the spin correlation functions derived from Mössbauer relaxation spectra of quasi-one-dimensional $A_2Mn_{0.98}Fe_{0.02}F_5(H_2O)$ we could fit the antiferromagnetic susceptibilities of $A_2MnF_5(H_2O)$ with $A = Na^+$, $(NH_4)^+$, K^+, Rb^+ obtained for single crystal samples. The calculation yielded characteristic parameters such as the local anisotropy D, the intra-chain exchange energy J, the inter-chain exchange energy $|J'|$, the Néel temperature T_N, and the spin canting angle φ.

Key words: Mössbauer Relaxation Spectra; Non-linear Excitations (Magnetic Solitons); 1-d Correlation Length; Exchange and Anisotropy Energy; Antiferromagnetic Order; Weak Ferromagnetism.