# Low Frequency Dielectric Dispersion in $KH_2AsO_4$ and $KD_2AsO_4$

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Low frequency dispersion close to the phase transition in KDA and DKDA is investigated.

The relaxation process in paraelectric phase of KDA is polidispersive and can be fitted to the Cole-Cole relation . The relaxation in ferroelectric phase is monodispersive of Debye type. $2^{o}K$ above $T_c$ (Fig.1) the value of relaxation time is 30 ms, approaching $T_c$ the relaxation time is decreasing, at $T_c$ it shows a jump and is increasing with decreasing temperature in ferroelectric phase. The relaxation process can be observed in the temperature regions $T-T_c=2K$ and $T_c-T=6K$. In the paraelectric phase the relaxation is polidispersive and the relaxation time is decreasing approaching $T_c$ what is in contradiction with the results of Adriaenssens[1]. His results in paraelectric phase can be compared with ours in ferroelectric phase.

The supposition of exponential relation between relaxation time and activation energy for reorientation of a molecular dipol deduced from a molecular field approximation leads to the temperature dependence of activation energy. Above $T_c$ activation energy is 0,17 eV and with decreasing temperature decreases, in ferro-phase is quite constant with value 0,16 eV. The temperature dependence in ferroelectric phase and the values agree with the measurements of Adriaenssens in paraelectric phase. In the crystal DKDA relaxation process in paraelectric phase in frequency region from 20 Hz to 1 kHz has not been observed. Experimental results of complex dielectric cnnstant in ferroelectric phase can be fitted to Debye's

formula where the relaxation process is monodispersive. In the vicinity of transition temperature the value of the characteristic relaxation time is 25 ms (Fig.1) and increases with decreasing temperature in region $T_c$-T = = 12°K where relaxation can be observed. The experimental results of low frequency dielectric dispersion with previously reported NMR spectra suggest that the relaxation is caused by appearance of polarized clusters in paraelectric phase (central mode motion) of by crystal defects which act nucleation centres for the polarized clusters. The possibility that crystal defects cause the low frequency relaxation can not be ignored.

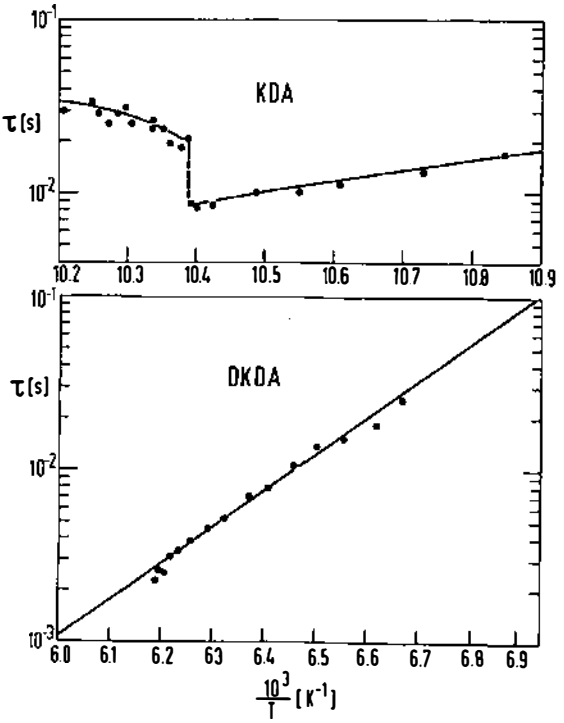


Fig.1. Temperature dependence of relaxation time of KDA and DKDA

Ref.1. G.J.Adriaenssens and J.L.Bjorkstam, Phys.stat.sol. (a) 13, 129 (1973)