Central Peak and Quasi-Elastic Light Scatering in Cubic Relaxor Ferroelectrics

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In our report results of studying of $PbMg_{1/3}Nb_{2/3}O_3$ (PMN), $PbMg_{1/3}Ta_{2/3}O_3$ (PMT), $PbSc_{1/2}Ta_{1/2}O_3$ (PST), and $Na_{1/2}Bi_{1/2}TiO_3$ (NBT) crystals by Raman and micro-Brillouin light scattering are presented. Need to note, that PMN, PMT, PST and NBT crystals are cubic relaxor ferroelectrics.

It is clearly seen in temperature behavior of the low-frequency vibration spectra: the velocity anomaly and corresponding broad maximum of damping in relaxors well correlate with the main dielectric maximum in the vicinity of a diffuse phase transition temperature. The anomalies are absent in $BaMg_{1/3}Ta_{2/3}O_3$ crystals where the acoustic response is determined by anharmonicity. Unusual frequency dispersion of the longitudinal acoustic phonons (LA) in PMN and PMT crystals was observed in our experiments that were in a good agreement with mode-coupling phenomena in neutron scattering. Investigation of the Brillouin scattering by Sandercock type tandem system gives possibility for correct analysis of the low frequency part of the vibration spectra of the crystals. We observed quasielastic light scattering and separated this addition contribution from the scattering spectra of the studied crystals vs. temperature. It was found that quasielastic light scattering in relaxors has a complicate structure and temperature behavior.

Presence of the quasielastic scattering with such properties (relaxation mode) shows that despite previous expectations order-disorder behaviour plays an important role in the dynamics of the diffuse phase transition.

In present report we would like to discuss: *(1)* Our results of broadband light scattering studies *(2)* Relation of our observation with previously published neutron and light scattering data [1-4].

References

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