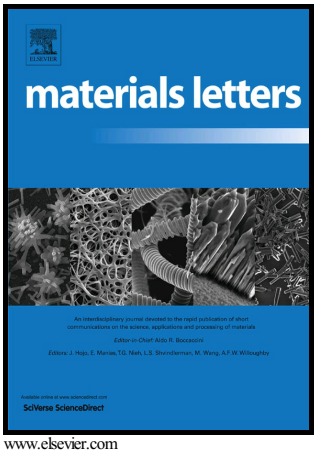

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ABSTRACT

We report the lattice dynamics of $0.8Pb(Zr_{0.52}Ti_{0.48})O_3$-$(0.2\text{-}x)Pb(Zn_{1/3}Nb_{2/3})O_3$-$xPb(Al_{1/2}Nb_{1/2})O_3$ (0.8PZT-(0.2-x)PZN-xPAN, $0.02 \leq x \leq 0.08$) ceramics around morphotropic phase boundary (MPB) by infrared and Raman spectra. The dielectric functions in the wavenumbers range between 50 and 1000 cm^{-1} were extracted from the factorized oscillator model. The addition of PAN to PZT-PZN system introduces Al^{3+} ions to the B-site and all of these Raman-active modes in the measured range are related to B-site atoms vibration. The effect of PAN addition leads to infrared and Raman modes shifting to higher wavenumbers, because the atomic weight of Al is smaller than that of Zn. Therefore, the substitution of B-site atom in PZT-PZN system is the dominant reason to influence the frequency shift of infrared and Raman modes.

Keywords: PZT-based ceramics, Morphotropic phase boundary, Dispersion relation, Lattice vibrations, Raman spectroscopy.

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