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Investigation of Local Structure and Cation Ordering in Dielectric Oxide Microwave Ceramics with stoichiometry $A(Li_x(Nb,Ta)_y)O_3$ Using ^{7}Li and ^{93}Nb solid-state NMR spectroscopy. RONY KALFARISI, NMR Spectroscopy Group, Physics Department, College of William and Mary — The local structure and cation ordering in dielectric oxide microwave ceramics with stoichiometry $A(Li_x(Nb,Ta)_y)O_3$ are investigated using ^{7}Li and ^{93}Nb solid-state NMR spectroscopy. For all samples, ^{7}Li MAS NMR spectra show one strong and sharp resonance peak indicating one unique environment which corresponds to local lithium environment of nearest B-site neighbor (nBn) surrounded by 4 LiO_6 octahedra and 2 NbO_6 octahedra (TaO_6 in some samples). In addition to this, ^{7}Li MAS NMR spectrum of $(Ca_{2/3}La_{1/3})(Li_{1/3}Nb_{2/3})O_3$ show one additional weak and broad resonance peak which can be assigned to nBn of 3 LiO_6 octahedra and 3 NbO_6 octahedra. ^{93}Nb MAS NMR spectra of samples with niobium content, show a resonance peak with tail toward the low frequency limit, an evidence to the existence of chemical shifts and quadrupole couplings distributions. Both $(Sr_{2/3}La_{1/3})(Li_{1/3}Nb_{2/3})O_3$ and $Ca(Li_{1/4}Nb_{3/4})O_3$ spectra show one broad resonance peak, which can be interpreted as one NbO_6 octahedron nBn with many slight variations through out the sample. While $(Ca_{2/3}La_{1/3})(Li_{1/3}Nb_{2/3})O_3$ spectra show four peaks correspond to four distinct NbO_6 octahedra local nBn environments with the nBn configuration as: (i) 3 LiO_6 and 3 NbO_6; (ii) 2 LiO_6 and 4 NbO_6; (iii) 1 LiO_6 and 5 NbO_6; (iv) all 6 NbO_6

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