Abstract Submitted
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EPR spectral study and modeling of lithium borovanadate $RLi_2OB_2O_3KV_2O_5$ glasses[1] BRANDON POLLPETER, BLANE BAKER, BIKESH DAHAL, William Jewell College, STEVE FELLER, Coe College — Utilizing electron paramagnetic resonance EPR spectroscopy, lithium borovanadate $RLi_2OB_2O_3KV_2O_5$ glasses with R = 0.4 and K ranging from 0.1 to 0.5 were analyzed in order to elucidate the environment of unpaired $3d^1$ electrons. Transitions associated with coupling of such electrons to vanadium nuclear spins were identified and modeled to reveal both g factor and A factor values. For a system with K = 0.3, representative data include: $g_{ll} = 1.9242$, $g_\perp = 1.9693$, $A_{ll} = 184.3768$ cm^{-1}, $A_\perp = 64.6568$ cm^{-1}, $\Delta g_{ll} = 0.0781$, $\Delta g_\perp = 0.0330$, and $\Delta g_{ll}/\Delta\ g_\perp = 2.3670$. A comparison revealing $g_{ll} < g_\perp < g_e$ is indicative of localized electrons residing in tetragonally-distorted octahedral sites. A slight increase observed in $\Delta g_{ll}/\Delta\ g_\perp$ values when K = 0.1 to K = 0.3 is further evidence of a possible elongation of the octahedral site associated with increasing K values. This pattern, however, is not present in systems with K values greater than 0.3, suggesting that perhaps no further elongation of the site is possible due to bond constraints. A comprehensive model will be presented to summarize data for the entire family of lithium borovanadates studied here.

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