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**NMR Studies of the Li-Mg-N-H Phases.** ROBERT BOWMAN, Jet Propulsion Laboratory, J. W. REITER, J. G. KULLECK, JPL, S.-J. HWANG, Caltech, WEIFANG LUO, SNL — Solid state NMR including magic-angle-spinning (MAS) and cross-polarization (CP) MAS experiments have been used to characterize various amide and imide phases containing Li and/or Mg. MAS-NMR spectra for the  $^1\text{H}$ ,  $^6\text{Li}$ ,  $^7\text{Li}$ , and  $^{15}\text{N}$  nuclei have been obtained to improve understanding on formation, processing, and degradation behavior. Only limited information could be obtained from the proton and  $^7\text{Li}$  MAS-NMR spectra to due large dipolar interactions and small chemical shifts. However, more success was obtained from the  $^6\text{Li}$  and  $^{15}\text{N}$  nuclei although their very long spin-lattice relaxation times did impact signal acquisition times. For example, three distinct  $^6\text{Li}$  peaks were resolved from  $\text{LiNH}_2$  phases that were clearly separated from the  $\text{LiH}$  secondary phase in these samples. While the  $^{15}\text{N}$  spectra for  $\text{LiNH}_2$  phase in isotopically enriched samples exhibited only a single peak at least three distinct  $^{15}\text{N}$  peaks were observed from the similarly enriched Mg amide samples. These differences will be related to crystal structures. The NMR spectra also revealed very little motion in these hydrides upon to nearly 500 K.

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