

Crystal Structures of Polymerized LiCl and dimethyl sulfoxide in the form of $\{2\text{LiCl}\cdot 3\text{DMSO}\}_\infty$ and $\{\text{LiCl}\cdot \text{DMSO}\}_\infty$

Nichole Valdez¹, David Hermann², Martin Nemer³, Mark Rodriguez⁴, Eric Allcorn⁵

¹*Sandia National Laboratories* ²*Sandia National Laboratories*, ³*Sandia National Laboratories*,

⁴*Sandia National Laboratories*, ⁵*Sandia National Laboratories*

nvalde@sandia.gov

Two novel LiCl·DMSO polymer structures were created by combining dry LiCl salt with dimethyl sulfoxide (DMSO). The first phase that forms has very small block-shaped crystals (<0.08 mm) that are monoclinic with a 2 LiCl : 3 DMSO ratio. When the solution is placed on a laboratory glass slide, the DMSO evaporates and a second phase begins to form with a plate-shaped crystal morphology. After ~20 minutes, large (>0.20 mm) crystals form with an octahedron morphology. The plate crystals and the octahedron crystals are the same tetragonal structure with a 1 LiCl : 1 DMSO ratio. We report these structures and compare them to other known LiCl·solvent compounds.

Sandia National Laboratories is a multi-mission laboratory managed and operated by National Technology and Engineering Solutions of Sandia, LLC, a wholly owned subsidiary of Honeywell International, Inc., for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-NA0003525.

This paper describes objective technical results and analysis. Any subjective views or opinions that might be expressed in the paper do not necessarily represent the views of the U.S. Department of Energy or the United States Government.