

STUDIES IN THE SYNTHESIS OF KDP NANO-CRYSTALS. S. King

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When crystallized, KDP (Potassium Dihydrogen Phosphate) is a non-linear and electro-optically active material used in optical modulators. This salt has the ability to change the refractive index, or in other words, the speed at which light travels through a material. The current issue with KDP crystals is that they are quite large, expensive, and fragile to work with. If they can be synthesized as nano-crystals they might be easier to incorporate into low-cost devices for manipulation of light. The basis of this work comes from previous research done under the direction of Dr. Smith by the graduate student Mufadal Ayubali Mohamedali (Ali). Ali synthesized KDP nano-crystals in the block copolymer of poly styrene and poly ethylene oxide.

In present research, the formation of KDP nano-crystals in the ion-binding homo-polymer, poly(tetrahydrofuran-2,5-diyl) is being explored. In this work, KDP is being generated in the homo-polymer system and evidence for the formation of nanocrystals will be looked at for in films directly doped with KDP and in films in which KDP is formed by stoichiometric neutralization of compositions doped with H_3PO_4 . Crystal formation will be monitored by differential scanning calorimetry and perhaps atomic force microscopy.