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Accession number:20112814136650
Title:Selective growth of highly efficient electrooptic stilbazolium crystals by sequential crystal growth in different solvents
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Source title:Crystal Growth and Design
Abbreviated source title:Cryst. Growth Des.
Volume:11
Issue:7
Issue date:July 6, 2011
Publication year:2011
Pages:3060-3064
Language:English
ISSN:15287483
E-ISSN:15287505
Document type:Journal article (JA)
Publisher:American Chemical Society, 2540 Olentangy River Road, P.O. Box 3337, Columbus, OH 43210-3337, United States
Abstract: We report on selective growth of highly efficient nonlinear optical stilbazolium crystals by using sequential crystal growth in different solvent systems. Stilbazolium-salt crystals DSTMS (N,N-dimethylamino-N′-methylstilbazolium 2,4,6-trimethylbenzenesulfonate) with state-of-the-art nonlinear optical properties exhibit a thin plate-like morphology when grown in methanol and a thick trapezoidal-like morphology when grown in acetonitrile. We demonstrate morphology and thickness control of bulk DSTMS crystals by using sequential crystal growth by choosing a different solvent for growing bulk crystals as for growing seed crystals. For crystals growing in methanol solution from trapezoidal-like seed crystals grown in acetonitrile solution, the average growth rate is similar as in methanol alone, but the specific growth rate is considerably different: the aspect ratio of such crystals may be 1 order of magnitude larger than for crystals growing in methanol alone. For crystals growing in acetonitrile solution from thin plate-like seed crystals grown in methanol solution, the thickness slowly increases, while the lateral size remains similar. Such morphology and thickness control of DSTMS by sequential crystal growth in different solvents is a promising technique for practical applications, where crystals of a certain thickness are desired, for example, for THz-wave generation, frequency conversion, electro-optics, and field detection.