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Title:A new stilbazolium salt with perfectly aligned chromophores for second-order nonlinear optics: 4-N,N-Dimethylamino-4-N'-methyl- stilbazolium 3-carboxy-4-hydroxybenzenesulfonate

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Abstract:A new organic nonlinear optical crystal 4-N,N-dimethylamino-4'-N'-methyl-stilbazolium 3-carboxy-4-hydroxybenzenesulfonate (DSCHS) has been developed with very promising properties for quadratic nonlinear optical applications. DSCHS single crystals with non-centrosymmetric structure have been obtained from aqueous methanol solution. X-ray crystallographic analysis revealed that the crystal structure of DSCHS is triclinic P1 with the chromophores aligned perfectly parallel, leading to the maximum possible order parameter  $\langle \cos^3 \theta \rangle = 1$  in the crystalline state, which is optimal for electro-optics, THz-wave generation and field detection applications. Kurtz powder test has shown that DSCHS exhibits a very large second-order optical nonlinearity, with a 30 percent higher second-harmonic signal than the well-known organic nonlinear optical crystal 4-N,N-dimethylamino-4'-N'-methyl-stilbazolium tosylate (DAST). © 2011 Elsevier Ltd. All rights reserved.

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Controlled terms:Chromophores - Crystal structure - Crystalline materials - Hydrogen bonds - Methanol - Nonlinear optics - Sulfur compounds - Terahertz wave detectors - Terahertz waves - X ray crystallography

Uncontrolled terms:Aqueous methanol solutions - Crystalline state - Kurtz powders - Non-centrosymmetric - Non-linear optical material - Nonlinear optical applications - Order parameter - Organic dye - Organic nonlinear optical crystals - Second order nonlinear optics -

Second-harmonic signal - Second-order optical nonlinearity - Stilbazolium salt - X-ray crystallographic analysis

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