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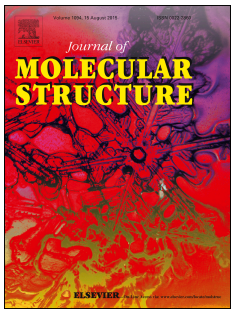

New solid forms of efavirenz: Synthesis, vibrational spectroscopy and quantum chemical calculations

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New solid forms of Efavirenz: synthesis, vibrational spectroscopy and quantum chemical calculations

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Abstract

Efavirenz,(S)-6-chloro-4-(cyclopropylethynyl)-1,4-dihydro-4-(trifluoromethyl)-2H-3,1-benzoxazin-2-one, is an anti HIV agent from the class of the non-nucleoside inhibitors of the HIV-1 virus reverse transcriptase. This paper describes the synthesis of two new solvatomorphs of efavirenz (EFV). The results through XRPD and DSC/TG indicate that the new forms undergo a solvent loss over the days, and then return to the original polymorph. Structural and spectral characteristics of EFV were studied by vibrational spectroscopy and quantum chemical methods. Density functional theory (DFT) calculations for the potential energy curve, optimized geometries and vibrational spectra were carried out using 6-311+G** basis sets and CAM-B3LYP functional, solid state calculations were also performed using DFT-XGGA (PBE-D3) exchange-correlation functional with the option of mixtures of Gaussian and plane waves method (GPW). Based on these results, the paper discussed the correlation between the vibrational modes and the crystalline structure of the most stable form of EFV. A complete analysis of the experimental infrared and Raman spectra was reported on the basis of the wavenumbers of the vibrational bands and the potential energy distribution.