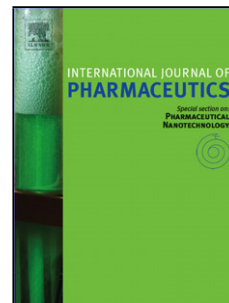


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A Comprehensive Spectroscopic Study of the Polymorphs of Diflunisal and their Phase Transformations

Anuradha R. Pallipurath^{a,b}, Francesco Civati^a, Juraj Sibik^c, Clare Crowley^d, J. Axel Zeitler^c, Patrick McArdle^{a,*}, Andrea Erxleben^{a,*}

^a School of Chemistry, National University of Ireland, Galway, Ireland

^b Department of Chemistry, University of Bath, Claverton Down, Bath BA2 1AY, UK

^c Department of Chemical Engineering and Biotechnology, Pembroke Street, Cambridge CB2 3RA, UK

^d Materials and Surface Science Institute, Department of Chemical and Environmental Sciences, University of Limerick, Ireland

* Corresponding authors. Tel.: +353 91 492487. Fax: +353 91 495576. School of Chemistry, NUI Galway, University Road, Galway Ireland. *E-mail address*: andrea.erxleben@nuigalway.ie (A. Erxleben) and tel.: +353 91 492483. Fax: +353 91 495576. School of Chemistry, NUI Galway, University Road, Galway Ireland. *E-mail address*: p.mcardle@nuigalway.ie (P. McArdle)

Abstract

Understanding phase transitions in pharmaceutical materials is of vital importance for drug manufacturing, processing and storage. In this paper we have carried out comprehensive high-resolution spectroscopic studies on the polymorphs of the non-steroidal anti-inflammatory drug diflunisal that has four known polymorphs, forms I – IV (FI – FIV), three of which have known crystal structures. Phase transformations during milling, heating, melt-quenching and exposure to high relative humidity were investigated using Raman and terahertz spectroscopy in combination with differential scanning calorimetry and X-ray powder diffraction. The observed phase transformations indicate the stability order FIII > FI > FII, FIV. Furthermore, crystallization experiments from the gas phase and from solution by fast evaporation of different solvents were carried out. Fast evaporation of an ethanolic solution below 70 °C was identified as a reliable and convenient method to obtain the somewhat elusive FII in bulk quantities.

Keywords: diflunisal, phase transformation, polymorphs, terahertz spectroscopy

Chemical Compounds

Diflunisal (PubChem CID: 3059)

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