

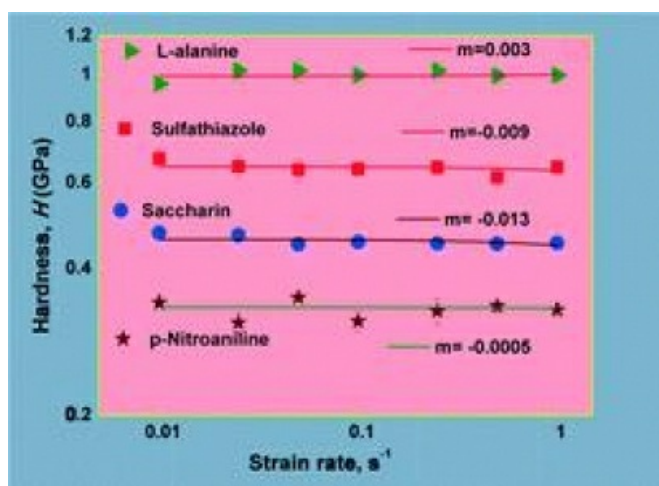
Indentation plasticity of molecular crystals: Loading rate sensitivity studies

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Understanding mechanical behaviour of molecular crystals has been the focus of intense research over the last few years with the advent of instrumented nanoindentation technique, which can probe the nanoscale mechanical properties of tiny volume materials and allows to establish structure-mechanical property relationships of various materials. However, to date, most of the indentation experiments were performed in quasi-static conditions at a relatively low loading rates. Here, we report the effect of loading rate on the plastic deformation behaviour of different molecular crystals, studied using instrumented nanoindentation technique. Experimental results indicate that the measured hardness values are loading rate insensitive irrespective of the structure, crystal packing, and bonding characteristics of the crystals examined here. The possible reasons for this loading-rate insensitivity and implications for applications in pharmaceutical manufacturing are discussed.¹

1. Devaraj Raut, Mangalampalli S. R. N. Kiran, Manish Kumar Mishra, Abdullah M. Asiri and Upadrasta Ramamurty, CrystEngComm, 2016,18, 3551-3555.



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