

# Structural Changes of Excipients Under Stress: an Atomic Force Microscopy Investigation

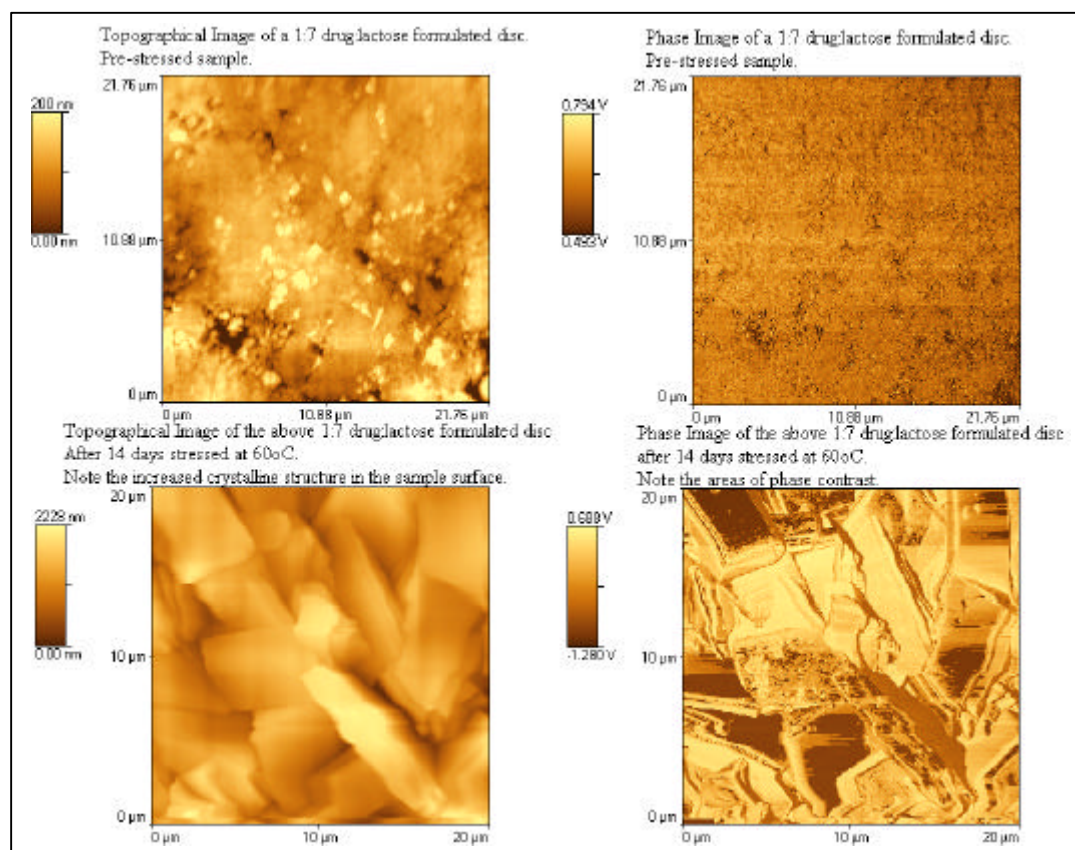
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The Atomic Force Microscope (AFM)<sup>i</sup> is a powerful tool used for imaging and interrogating surface properties at the nanoscale. It essentially works by monitoring the forces experienced by sharp probe as it is scanned across a sample surface. An image is formed by recording the path of the probe in all three spatial dimensions.

Here, the AFM has been used to study the surface structure of 1:7 pyridoxal hydrochloride (phcl):lactose formulated discs both before and after being stressed for 14 days at 60°C. The images below show that before stressing the lactose formulated disc shows phcl drug particles on the surface of a compressed powder surface. After stressing, the surface now shows a more crystalline structure where the phcl may be incorporated into the crystalline structure. It also appears that the phcl drug may have undergone polymorphic transformation as indicated by the strong phase contrast<sup>ii</sup> in the phase image after stressing<sup>iii</sup> cominsurate with the work of Durig and Fassihi (1993).



Reference:

<sup>i</sup> Binnig *et al*(1986)., Phys. Rev. Lett,56:930-933

<sup>ii</sup> Danesh *et al*.(2000) Langmuir 16,866-870

<sup>iii</sup> Durig, Fassihi(1993), Int. J. Pharmaceutics,97,161-170