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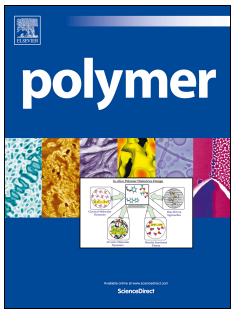


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# Mechanical properties of Ropaque hollow nanoparticles

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**Abstract**

The elastic properties and strength upon compression of commercial Ropaque polystyrene hollow particles were investigated by atomic force microscopy (AFM). These particles are commonly used in paints as opacifying agents, as their internal air void effectively scatters light. A sharp AFM tip was used to apply a point load to the particle surface, and increased to probe both the elastic and plastic deformation of the shell, and then further until the shell broke. For small deformations, the deformation increased linearly with applied force. The Young's modulus was calculated by accounting for the effect of the rigid substrate, and compared to the modulus obtained from the Reissner and Hertz models. The minimum stress needed to destroy the integrity of the shell was extracted and found to be smaller than or close to that of silica hollow particles with different shell thickness tested in the literature.