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Contact Angle Hysteresis of Photo-Responsive Materials[1]
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An atomic force microscope (AFM) is used to measure the meniscus force on individual microspheres coated with photo-responsive materials such as anatase and rutile TiO_2, azobenzene, and other doped oxides as they contact and are retracted from an air/water interface. By exposing the coated microspheres to UV light, the contact angle change. The change can be detected by measuring the increase in the meniscus force. Exposure to visible, infrared, or far infrared light – as the specific material requires - reverses the contact angle change. The measured force-distance curves are fitted to macroscopic wetting theory. From these measurements, the contact angle, the contact angle hysteresis, and the position of the contact line pinning were simultaneously determined. This allowed for a quantification of the contact angle changes from photo-switching.

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