

# Ultrafast Dynamics of Cyclooctatetraene at Cu(111) Surface

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The diffusion of Cyclooctatetraene on Cu(111) was studied using Helium-3 Spin Echo Spectrometry and Density Functional Theory. A flat, chemisorbed conformer of cyclooctatetraene present new paradigm in surface diffusion where adsorption on non-symmetrical bridge-sites gives rise to an apparent jump diffusion between non-degenerated hollow sites. While this motion is typical to conditions of high friction and high corrugation of the particle-substrate potential, cyclooctatetraene also moves in ballistic fashion (low friction, low corrugation). We consider vast range of explanations for this puzzling result of diffusion on opposite ends of the friction-potential regime, and are left with the possibility that a different, physisorbed conformer of cyclooctatetraene is present on the surface.