Abstract Submitted
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Dynamics of Nanoparticle Adhesion[1] ANDREY DOBRYNIN, JAN-MICHAEL CARRILLO, University of Connecticut, ELIE RAPHAEL, ESPCI — We have performed molecular dynamics simulations of peeling of nanoparticles from substrate to understand the dynamics of nanoparticle adhesion. In our simulations we have calculated the potential of mean force characterizing the strength of the nanoparticle interaction with the substrate as a function of the particle-substrate separation. These simulations have shown that the detachment of the nanoparticle from substrate occurs through neck formation. The neck height decreases with increasing nanoparticle shear modulus (crosslinking density). Furthermore our simulations have established that the detachment time t_R scales with the applied force as f^{-5}. This strong force dependence is a result of the fine interplay between nanoparticle surface energy, elastic energy and its adhesion to the substrate that controls the shape of the nanoparticle.

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Jan-Michael Carrillo
University of Connecticut

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