Spreading of Nanoparticles on a Substrate ANDREY DORBRYNIN,
Polymer Program, Institute of Materials Science, University of Connecticut, ELIE
RAPHAEL, ESPCI, Paris, France, JAN-MICHAEL CARRILLO, Polymer Program,
Institute of Materials Science, University of Connecticut — Using combination of
the molecular dynamics simulations and theoretical analysis we have studied the
deformation of crosslinked polymeric nanoparticles on solid substrate. Our simula-
tions show that the deformation of the adsorbed nanoparticles is a function of the
dimensionless parameter GR/W, where G is the particle shear modulus, R parti-
cle size and W is the work of adhesion. For small particle deformations, which is
usually the case for the highly crosslinked nanoparticles, the particle deformation
can be described in the framework of the classical Johnson, Kendall, and Roberts
(JKR) theory. However, we observed a deviation from the classical JKR theory in
the case of the weakly crosslinked nanoparticles which experience large deformations
upon particle adsorption. We propose a theoretical model which accounts for large
particle deformations.

Carrillo Jan-Michael
Polymer Program, Institute of Materials Science, University of Connecticut