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Nanoscale Tribological Properties of Nanodiamond LUKE LUTKUS, VASUDEVA RAO ARAVIND, BENJAMIN LEGUM, Clarion University, CLARION UNIVERSITY TEAM — Due to their rich surface chemistry, excellent mechanical properties, and non-toxic nature, nanodiamond particles have found applications in a wide variety of fields such as filler materials in nanocomposites, biomedicine, tribology and lubrication, targeted drug delivery systems, and surgical implants. This study is focused on nanodiamond particles synthesized using detonation synthesis. We used peak force tapping atomic force microscopy to study adhesion and agglomeration in nanodiamond particles. We find that adhesion force between nanodiamond particles and sharp atomic force microscope tips can range from 0.1 to 2.0 nN depending on purity of particles, size of the probe, and environmental conditions. We observed that these particles can form agglomerates consisting of about 4 to 6 particles, due to interparticle forces.

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