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Device Piggy Back on Bacteria: Selective Nanoparticle Deposition on Live Bacterium VIKAS BERRY, RAVI SARAF, University of Nebraska - Lincoln — Due to strong electrostatic attractive force, charge stabilized nanoparticles in solution (such as of Au), deposit and self-assemble at a faster rate on a solid substrate than particles stabilized by steric hindrance. The electrostatic interparticle repulsion between charge particles restricts the structure to a monolayer; however, the layer can not be percolating. On biological surfaces, with tethered functional biomolecules, we demonstrate fabrication of monolayers of 10-30 nm Au nanoparticles that are electrically conducting over 10 μm. The contact appears to be a metal/insulator/metal junction where the insulator is 'charge neutralizing' biomolecules on the bacteria surface that 'grabs' the particle as it lands on the surface. By modulating the property of the 'insulator' a reversible humidity sensor is designed with higher sensitivity at low humidity that is in contrast with most impedance based humidity-sensors.

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