

Material Transfer in Contact Electrification

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Abstract— Despite the long history of studies, the mechanism of static electricity developed on contact electrified surfaces is only poorly understood owing to the fact that it involves rather complicated events one of which is material transfer. Studies have confirmed that material transfer takes place during contacts of all electrets^{1,2}. Although it is of vital importance because the material properties were shown to govern the phenomena of contact electrification, there has been only a few examples trying to correlate material transfer upon contact to contact charging of materials. Here we present a comprehensive study on this correlation starting with the proof of material transfer with modern experimental techniques involving X-Ray Photoelectron Spectroscopy XPS and Confocal Raman Microscopy and showing how material transfer affects the charging (and discharging) on polymer surfaces by Atomic Force Microscopy (AFM) and Kelvin Force Microscopy (KFM). Understanding material transfer on surfaces and the related charging is an important step to solve the identity of actual charge carriers in this 2000-year old problem.

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