# Correlation of Contact Deformation with Contact Electrification of Identical Materials

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***Abstract*— To reveal what factors determine charge transfer when two surfaces are contacted and then separated, an important test case is the contact electrification of identical materials. Therefore we conducted an experimental study on the contact electrification produced by two chemically identical glass plates under different contact forces. It was found that, for given plate sizes, the mean value of the surface charge density is independent of the contact force, but the standard deviation of the surface charge density increases with increasing contact force, which indicates that the magnitude of charge transfer is enhanced with increasing contact force. Contact between plates of different sizes leads to the systematic transfer of charge in one direction. To understand this effect, finite element modeling was carried out, which shows that the contact between plates of different sizes leads to different in-plane strain! s developing in the two plates. The surface charge density from contact electrification correlates with the difference in the in-plane strain between the contacted plates. In similar way, we also studied the triboelectrification due to the sliding contact of two glass plates, and the collision of two glass spheres, and find that the triboelectrification and dynamical electrification are also highly related to the in-plane strain. The results suggest that the in-plane strain difference between contact surfaces plays an essential role in contact electrification and may be a key driving force for the charge transfer between chemically identical surfaces.**