

Trends on Physics of Triboelectric Effect and Applications

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Abstract. Physics of triboelectric effect has been known for thousands of years. Since the invention of the triboelectric nanogenerator (TENG) in 2012, it has become one of the most vital innovations in energy harvesting technologies. This is one of the most frequently experienced effects that each and every one inevitably uses every day. Fundamentally friction driven static electrification is familiar, but its basics have long been unknown mysteriously and have continually perplexed the best scientists from ancient Greece to the modern high-tech era. Triboelectric effect is a general cause of everyday's electrostatics. The phenomenon itself is obvious as in combing hair or lightning in daily life, and humanity discovered electricity from it and came to understand almost every aspect of electricity and magnetism through Maxwell's equations. But why do we not yet rigorously know which material is charged positively or negatively when two materials are rubbed? What is the fundamental origin of the mysteriousness of triboelectric charging? In view of the above, this paper discusses the physics behind of it, its trends and applications and so on.