Triboelectric Generation

Triboelectric nanogenerators leverage the triboelectric effect to generate current. The triboelectric effect refers to the phenomenon where two materials with differing electron affinity exchange charge when coming into contact. The material with the higher electron affinity will become negatively charged while the other material becomes positively charged. When external forces cause the two materials to separate an electric field is induced between the charges. Consequently, a voltage arises between the two materials. When a circuit connects the two materials, a current will flow to balance the potential difference. When the materials are again moved closer together by an external force, a current will be induced into the opposite direction.

The Triboelectric nanogenerator itself is not necessarily in the nanoscale, but the operating principle of the triboelectric effect is a process at nano scale.

Research has been done in using 2d materials like graphene as the triboelectric material. This has the benefit that a lot of surface area can be compressed into a small volume.

How can we simulate the power output of any generator idea?

<https://www.kaggle.com/datasets/muhammadhamadzaheer/helmet-mounted-inertial-measurement-unit-dataset>