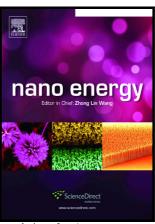
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Triboelectric Nanogenerator for Mars Environment

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Abstract

Consistent and reliable power supply is critical for interplanetary exploration missions and

habitats on Mars. Abundant wind, strong dust storms and surface vibrations on Mars are

attractive mechanical sources to convert into electrical energy. Conventional electromagnetic

generators are unsuitable for planetary exploration due to the heavy weight of permanent

magnets and metal coils and high launch costs. Triboelectric nanogenerator (TENG) yielding

high output power per mass is a potential alternative. The impact of Mars environment on

triboelectricity generation is an unknown but critical issue, which is investigated here using a

Mars analogue weather chamber. Individual and combined effects of environmental factors such

as atmospheric pressure, atmospheric composition, temperature, ultraviolet and gamma

radiations on the performance of TENG are analyzed. The potential of TENG for Mars

exploration is addressed based on the experimental results and scientific implication.

Graphical abstract

Keywords

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