Application of Hybrid Energy Systems Based on Triboelectric Nanogenerators (TENG) to Smart Settlements

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Climate change and energy crisis are one of the most urgent problems facing humanity and require new solutions.Many Areas(China,India, USA, etc.) have experienced drastics climate change due to the amount of carbon dioxide(CO2).In addition, the creation of necessary sources for the payment of energy supply, ensuring the security of these sources, as well as the transmission of the obtained electric energy to large-scale cities, towns and other residential areas require significant financial costs. In order to solve these listed problems, the application of sensor technologies in order to create ecologically clean and safe new types of energy generating systems, transfer the obtained energy correctly and monitor the environment in everyday life is considered the most promising approach. In the presented project, the development of a hybrid form of energy system (HFES) using environmentally friendly renewable energy sources (solar energy, wind, water, biomechanical energy) for the payment of energy supply in residential areas, significantly saving the accumulated energy and reducing costs It was proposed to create a smart settlement model based on self-powered sensors with the application of smart distribution technology and the use of triboelectric nanogenerators. In HFES, solar energy is generated by solar panels, wind energy by vertical wind turbines, energy from rain and other water sources by hydrogen generators, and generation of mechanical (biomechanical energy, vibration, wave energy) energy by triboelectric nanogenerators. Due to HFES, it is possible to effectively produce electricity in everyday life in settlements regardless of weather conditions and environment, to create sustainable energy supply and to ensure intelligent distribution due to sensor systems.

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