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Piezoelectric Biomaterials Toward Energy Harvesting

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Abstract

Emerging wearable and implantable electrical devices have the potential to revolutionize health monitoring in vivo. However self-powered materials must be biodegradable, low-cost, and amenable to large-scale production. Biomolecules, in particular amino acids and short peptides, are promising candidates as their crystals can be piezoelectric and mechanically stable for energy harvesting. However, the large-area growth of biocrystals with ordered structures and large macroscopic polarization remains challenging, which limits their applications for green energy harvesting. This report focuses on the piezoelectric biocrystals assembled with minimalistic building blocks. The growth mechanisms of ordered array structures and the mechanism to produce piezoelectric polarization are explored. Strategies to control the piezoelectric response of biomaterials are reported. Finally, the application potential of nanogenerator based on biomaterials are discussed.

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