Flexible Nanocomposite Polymer Materials for Energy Harvesting and Heat Management

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Today's quest for sustainable energy solutions through greener energy harvesting and heat-management technologies has recently developed a significant interest in new flexible and biocompatible nanocomposite ceramics with large electromechanical, triboelectric, and electrocaloric (EC) effects [1]. Therefore, an overview of experimental and theoretical investigations of the large EC, piezoelectric, and triboelectric response in flexible ceramic nanocomposites exploiting enhanced multiferroic properties of ferroelectric nanoparticles within the polymer matrix will be presented in this contribution. Specifically, the enhanced EC response in lead-free BCZT and BaTiO3-based nanoparticles will be reviewed, including flexible polymer composites' large energy harvesting potential [2]. The impact of filler’s dielectric permittivity and aspect ratio in high-k polymer and the benefits of combining 1D and 3D nanofillers on enhanced properties of flexible nanocomposites will be discussed [3].

References

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