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# Enhanced dielectric properties through using mixed fillers consisting of nano-barium titanate/nickel hydroxide for polyvinylidene fluoride based composites

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## Abstract

The dispersion of nano-barium titanate(NBT) in polyvinylidene fluoride(PVDF) is one of the key issues in dielectric composites. Various NBT surface modification strategies which suffer from complex process and small-scale production have been reported. Herein, in-situ synthesized three-dimensional Ni(OH)<sub>2</sub> is introduced to improve NBT dispersion in PVDF. During hydrothermal reaction, NBT aggregates are dispersed on the petals of in-situ grown Ni(OH)<sub>2</sub> crystals as small aggregates. The three-dimensional structure of Ni(OH)<sub>2</sub> can act as physical barrier to prohibit secondary agglomeration in PVDF to allow rather uniform NBT dispersion. Meanwhile, these hydroxyl groups on Ni(OH)<sub>2</sub> ensures good interaction between filler and PVDF, and trigger  $\beta$  crystals. Comparing with NBT/PVDF containing the same amount of filler(2.5wt.%), the breakdown strength and maximum energy density containing mixed filler increases 14% and 70%, reach 282.6KV/mm and 6.13J.cm<sup>-3</sup>, respectively. This study provides a new

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