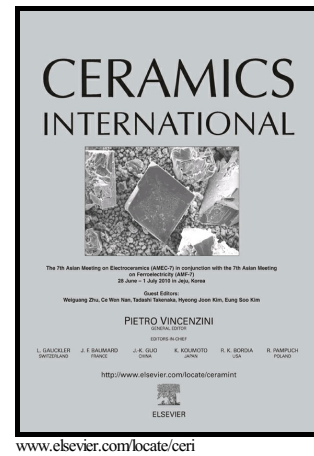


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# Pyroelectric performances of 1-3 ferroelectric composites based on barium titanate nanowires/polyvinylidene fluoride

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## Abstract

Pyroelectric properties of 1-3 ceramic/polyvinylidene fluoride (PVDF) composites by using barium titanate nanowires (BTnws) and dopamine modified BTnws (DM-BTnws) as inclusions were firstly reported. 0-3 composites based on dopamine modified BT nanoparticles (DM-BTnps)/PVDF were also prepared for comparison. It was found that low contents of DM-BTnws in PVDF are beneficial for achieving high fraction of  $\beta$ -phase content based on the analysis results of X-ray diffraction (XRD), Fourier transform infrared (FTIR) and electric displacement-electric field ( $D$ - $E$ ) measurements. The enhancement of  $\beta$ -phase content in the DM-BTnws/composited film was believed to originate from strong hydrogen bonds interactions between poly-dopamine and PVDF molecules, which induced phase transition in PVDF from  $\alpha$ -phase into  $\beta$ -phase. However, although DM-BTnws improved  $\beta$ -phase content and, accordingly, pyroelectric coefficient of the composites, they deteriorated dielectric performances of PVDF, reducing pyroelectric performances of the composites in terms of voltage and detectivity figures of merit.

*Keywords:*

PVDF; BTnws; Flexible infrared detector; Dopamine; Pyroelectric; Dielectric

## 1. Introduction

Compared with pyroelectric infrared detectors based on traditional pyroelectric inorganics[1-4], those based on polyvinylidene fluoride (PVDF) or its copolymer[5-8]

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