THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學

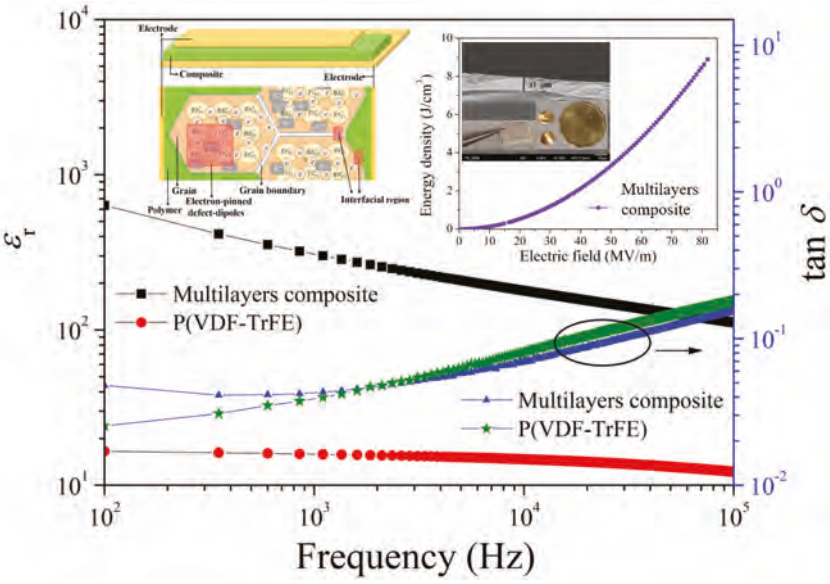
TechConnect INNOVATION AWARD 2018

Composite Multilayers Capacitors with Colossal Permittivity Materials for Electronics and Energy Storage Applications

應用於電子及能源儲存的巨介電複合材料多層電容器

Professor HAO Jianhua, Professor & Associate Head, and Ms TSE Mei-yan, Department of Applied Physics

Materials with colossal permittivity (CP) have shown great technological potential for advanced microelectronics and high-energy-density storage applications. Original CP ceramics exhibit high-performance dielectric behaviors, including temperature and frequency stable CP value and sufficiently low dielectric loss. Importantly, the technology on ceramics is further developed to multilayer-structured ceramic/polymer composites. Surface hydroxylated ceramic fillers, embedded in copolymer matrix can achieve high dielectric constant and exceptional low dielectric loss over a broad frequency range, as well as high energy density. The host oxides used in this CP system is friendly to the environment, non-toxic and abundant. Additionally, the process developed is relatively simple, low cost and suitable for mass production-scale. Therefore, these composite capacitors have great technological potential for many applications. Compared to the conventional ceramic materials, these composites in this work are lightweight, scalable and easily fabricated into complex shapes towards miniaturization of the compact systems. The additional flexibility feature of them also possess broad application prospects in modern electronic and energy storage devices.



全球對能源儲存的需求在過去十年急劇飆升，不少科研團隊因而相繼投入創新電容器的研究，力求研發出比傳統電池充電更快、儲存功率更高、循環壽命更長的電容器。理大此項發明乃首次在含有金屬離子摻雜巨介電材料的柔性複合電容器中，實現同時具有高儲存能量值、極小能量漏失率和高能量儲存密度。此技術主要採用二氧化鈦，是無毒、環保的材料，而且蘊含量豐富和製造成本低，相比傳統的化學電池結構，具多方面優勢，包括提高安全性。

www.polyu.edu.hk/itdo

PolyU ITDO

PolyU ITDO

Food Safety Consortium

itdo@polyu.edu.hk

Innovation and Technology Development Office
創新及科技發展處

Contact Us
Ir Steven LAM, Manager, Innovation and Technology Development Office
T (852) 3400 2864 E steven.tf.lam@polyu.edu.hk