0-3 CONNECTIVITY OF PVDF/BST PIEZOELECTRIC COMPOSITES

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ABSTRACT

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Film mechanical sensors, one of the piezoelectric applications, which are focused on this research, are used to measure or detect various mechanical quantities. This work extended the range of material properties by fabricating PVDF/ $Ba_{0.7}Sr_{0.3}TiO_3$ composite film. The $Ba_{0.7}Sr_{0.3}TiO_3$ as piezoelectric ceramic is induced in composite to increase the dielectric constant and piezoelectric properties. A certain weight fraction of 0.3, 0.5 and 0.7 of barium strontium titanate ($Ba_{0.7}Sr_{0.3}TiO_3$) powder at different calcine temperature was embedded in a matrix of poly vinylidene fluoride (PVDF) before compression molding into 100-200 μm thick sheets. The crystal phase of PVDF, $Ba_{0.7}Sr_{0.3}TiO_3$ and composite is investigated. Subsequently, thermal properties at differential %wt of the ceramic were studied. The microstructure of the composite was observed using scanning electron microscopy (SEM).The dielectric constant and the loss tangent of composites at different %wt and different calcining temperature of ceramic were also investigated.

บทคัดย่อ

กิตติคุณ เกาะไพบูลย์ : เพียโซอิเล็คตริกคอมพอสิตชนิด 0-3 ของโพลิไวนิลลิดีนฟลูออไรด์และแบเรียมสตอนเทียมไททาเนต (0-3 Connectivity of PVDF/BST Piezoelectric Composites) อ. ที่ปรึกษา : ดร.หทัยกานต์ มนัสปิยะ และ ดร.พิทักษ์ เหล่ารัตนกุล 93 หน้า

ฟิล์ม ตรวจ จับ เป็นหนึ่งใน การใช้งานทาง เพียโซอิเล็คทริค ซึ่งเราสนใจในงานวิจัยนี้ เป็นการใช้วัด หรือ ตรวจจับ ปริมาณ ของแรงกลต่างๆ ในงานนี้ ได้ใช้ โพลิไวนิลลิดีนฟลูออไรด์ (PVDF) และแบเรียมสตอนเชียมไททาเนตในสัดส่วนแบเรียมต่อ สตอนเชียม 0.7:0.3 ($Ba_{0.7}Sr_{0.3}TiO_3$) มาสังเคราะห์สารคอมพอสิตฟิล์ม แบเรียมสตอนเชียมไททาเนต เป็นเซรามิกเพียโซอิเล็คทริค ถูกนำมาใช้ในสารคอมพอสิตเพื่อ เพิ่ม ค่าไดอิเล็คทริก และคุณสมบัติทาง เพียโซอิเล็คทริค สัดส่วนน้ำหนักที่แน่นอน คือ 0.3 0.5 และ 0.7 ของ ผงแบเรียมสตอนเชียมไททาเนต ที่อุณหภูมิของการ แคลไซด์ ต่างๆกันและนำมาใส่ในสารหลัก โพลิไวนิลลิดีนฟลูออไรด์ ก่อนอัดให้ได้ฟิลม์หนา 100-200 ไมครอน ได้ทำการ ศึกษาผลึกของโพลิไวนิลลิดีนฟลูออไรด์, แบเรียมสตอนเชียมไททาเนต และคอมพอสิดตามด้วยการศึกษาสมบัติทางความร้อนของสารประกอบที่สัดส่วนต่างๆจุลโครงสร้างของคอมพอสิดถูกวิเคราะห์ด้วยกล้องจุลทรรศน์อิเล็กตรอนแบบส่องกราด (SEM) สำหรับ ค่าไดอิเล็คทริกและค่าการสูญเสียทางไดอิเล็คทริก ที่ สัดส่วนต่างๆ และแคลไซด์ ต่างๆกัน ของผงแบเรียมสตอนเชียมไททาเนได้ทำการวิเคราะห์เช่นกัน

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