

Enhancing Dielectricity of Barium Titanic/Silicone Composite for Mechanical Sensor

(名古屋工業大学先進セラミックス研究センター)
Guo Chen, Hadi Razavi, 高井千加, 藤正督, 白井孝

Organic-inorganic combination is a simple and effective method to maximize the practical performances of materials. Barium Titanic is a type of ceramic with high dielectric constant while silicone is a type of elastomer with low elastic modulus, composite fabricated by them could obtain both the advantages of them. Mechanical sensors fabricated by these hopeful materials will not only have low manufacturing costs but can also be utilized in many applications areas. Barium Titanic/Silicone composite was fabricated after improving the compatibility between Barium Titanic particles and silicone by surface-modification by silicone coupling agents and powerful mechanical treatments. The SEM observation and dielectric measurement proved that both of dispersity of Barium Titanic particles and dielectricity of Barium Titanic/silicone composite were improved. Membrane of Barium Titanic/silicone composite was manufactured and its application as a mechanical sensor was discussed under several conditions. The motion energy of moving object is thought able to be detected through the variation of dielectric constant caused by collision with the membrane. Its prospect for many further useful applications can be predicted due to the excellent properties for the composite.

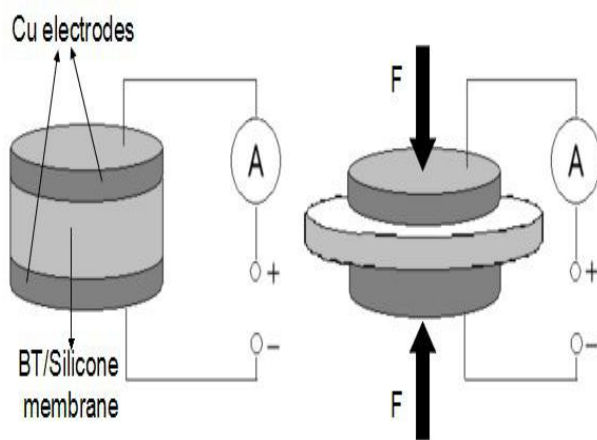


Fig.1. Measuring circuits for BT/silicone membrane

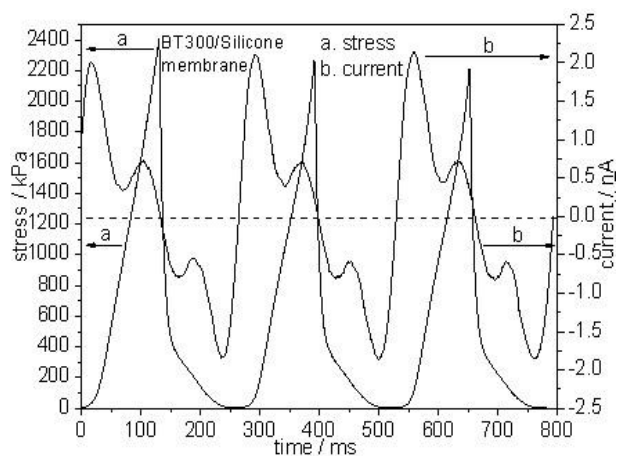


Fig.2. Periodic variation of stress and current of measuring circuit containing BT/silicone membrane