

## Smart Material for Bacterial Detection Based on Polydiacetylene/Polyvinyl Butyrate Fiber Composites

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**Abstract :** Conjugated polymers are smart materials that show tremendous practical applications in diverse subjects. Polydiacetylenes are conjugated polymers with special optical properties. In response to the environmental changes such as pH and molecular binding, it changes its color. Such an interesting chromic and emissive behavior of polydiacetylenes make them a highly popular polymer in wide areas, including biomedicine such as a biosensor. In this research, we used polyvinyl butyrate as a matrix to fibrillate polydiacetylenes. We initially prepared polyvinyl butyrate/diacetylene matrix using forcespinning technique. They were then polymerized to form polyvinyl butyrate/polydiacetylene (PVB/PDA). These matrices then studied for their bio-sensing response to gram-positive and gram-negative bacteria. The sensing ability of the PVB/PDA biosensor was observed as early as 30 min in the presence of bacteria at 37°C. Now our effort is to decrease this effective temperature to room temperature to make this device applicable in the general daily life. These chromic biosensors will find extensive application not only alert the infection but also find other promising applications such as wearable sensors and diagnostic systems.

**Keywords :** smart material, conjugated polymers, biosensor, polyvinyl butyrate/polydiacetylene

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