

Elastomeric Polymers for Conductive Layers of Flexible Sensors: Materials, Fabrication, Performance, and Applications

Yingxiang Huang¹, Cong Peng¹, Yu Li², Yanzhao Yang³, and Wei Feng¹

¹Beijing University of Chemical Technology

²Affiliation not available

³Tianjin University

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Abstract

In the wave of the Internet era created by computer and communication technology, flexible sensors play an important role in accurately collecting information owing to their excellent flexibility, ductility, freeform bending or folding, and versatile structural shapes. By endowing elastomeric polymers with conductivity, researchers have recently devoted extensive efforts toward developing high-performance flexible sensors based on elastomeric conductive layers and exploring their potential applications in diverse fields ranging from project manufacturing to daily life. This review reports the recent advancements in elastomeric polymers used to make conductive layers, as well as the relationships between elastomeric polymers and the performance and application of flexible sensors are comprehensively summarized. First, the principles and methods for using elastomeric polymers to construct conductive layers are provided. Then, the fundamental design, unique properties, and underlying mechanisms in different flexible sensors (pressure/strain, temperature, humidity) and their related applications are revealed. Finally, this review concludes with a perspective on the challenges and future directions of high-performance flexible sensors.

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