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**Mussel-inspired synthesis of barium titanate@poly(dopamine)@graphene oxide
multilayer core-shell hybrids for high-performance dielectric elastomer actuator**

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Abstract: Novel barium titanate@poly(dopamine)@graphene oxide (from inner to outer) (denoted as BT@PDA@GO) multilayer core-shell hybrids were synthesized in this study. Then, the BT@PDA@GO multilayer core-shell hybrids were incorporated into NBR matrix to prepared dielectric elastomer composite. The results showed that the dielectric constant of NBR composite filled with BT@PDA@GO hybrids reached to 15 at 1 kHz, which was about 170% times larger than that of pure NBR, whereas the dielectric loss was just about 0.02 at 1 kHz. In addition, the BT@PDA@GO/NBR composite exhibited a large actuated strain of 8.6% at electric field of 35 kV/mm, about 200% times of pure NBR (4.2%) at the same electric field. This research might help to establish a new strategy to obtain a high performance dielectric elastomer actuator.

Keywords: multilayer core-shell hybrids; dielectric elastomer; elastic modulus; dielectric constant; actuated strain

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