

CONTROLLING THE MAGNITUDE AND POLARITY OF SURFACE CHARGE FOR PEBA POLYMER BY ADDING UIO-66 MOFS

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In recent years, the search for materials possessing higher triboelectric performance has intensified. This interest stems from the desire to find materials suitable for enhancing triboelectric nanogenerator (TENG) device efficiency. The polarity of the polymer surface charge is important for constructing triboelectric devices where asymmetric charging tendencies of contacting materials are required. In the present work, we show that the addition of UiO-66 and UiO-66-NH₂ metal organic framework (MOF) particles into polyether block amide (PEBA) polymer increases the triboelectric surface charge density and allows controlling the polarity of charge [1]. The composites of PEBA polymer with 0.1 – 5 wt.% MOFs enhanced the surface charge density of pristine PEBA in the whole compositional range. The triboelectric properties can be tuned not only by the amount of MOF fillers but also by modification of UiO-66 1,4-benzenedicarboxylic acid linkers with additional –NH₂ groups. PEBA/UiO-66-NH₂ composites remain positively charged, while PEBA/UiO-66 system undergoes the change of the triboelectric surface charging from positive to negative between 0.5 wt.% and 1 wt.% (Fig.1). This material shows more tendency for negative charge than Teflon.

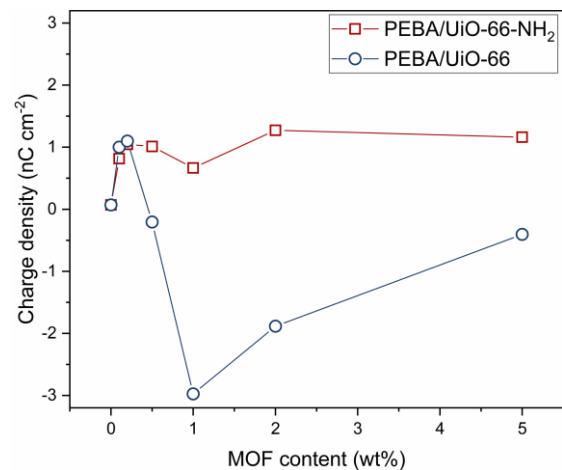


Fig.1 Charge density of PEBA/UiO-66 and PEBA/UiO-66-NH₂ composite based contact layers as a function of MOF content in them.

References

1. L. Lapčinskis, A. Šutka, M. Kinka, F.-K. Shieh, S. Balčiūnas, R. Grigalaitis *Mater. Adv.*, 2024, 5, 4242-4250