

Reusable PM2.5 Dust Proof Mask Based on Polybenzimidazole Nanofiber: A Highly Breathable Air Filter Mask

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Recently, ultrafine dusts (PM_{2.5}) are reasons for air contamination. The PM_{2.5} can cause serious respiratory disease because releasing PM_{2.5} from human bodies are very difficult due to its size. Numerous scientists have developed filter materials for masks can screen PM_{2.5}. However, most filters exhibited severe air-pressure drop and cause difficulty in breathing. In this research, filters made of electrospun polybenzimidazole (PBI) nanofiber are developed and explored its PM_{2.5} filtering efficiency. Many thanks to the high dipole moment of PBI (6.12D), The PBI nanofiber filters shows a comparable PM_{2.5} filtering efficiency of about 98% compared to commercial filters based of PU, but exhibits almost three times lower air-pressure drop than the mask filters in the market. Furthermore, we developed effective cleaning methods to reuse the filters that are contaminated with organic dusts. This research was supported by Korea Ministry of Environment (MOE) as “Advanced Technology Program for Environmental Industry Program”.