A Wearable Electronic Anti-smog Face Mask

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Nowadays, the fog and haze is becoming a serious global problem, but normal mask has high breathing resistance. To solve the problem, we decided to make a mask with low breathing resistance, and high PM2.5 filtering performance. We used an experiment to verify if water can filter the pollution air. The result was not satisfying. We found that when the air was pumped into the water, PM2.5 particles were bubble wrapped, yet not got in touch with the water but escaped outside. So we used capillary channels to drain the air into water and shattered the small bubble with ultrasonic vibration. In this way we can increase the contact time and area between the air and the water. We also added the Anion purification, which can kill the bacteria. In order to characterize the performance of the electronic mask. We bought three kinds of masks in the market to do the comparative testing. According to the data, our mask has the best filtering performance (Environment PM2.5: 952ug/m3 after filtration: 32ug/m3) and the lowest breathing resistance (Exhalation pressure: 68Pa Inhalation pressure: 84Pa). After testing, we confirmed that our mask can work continuously for more than 5 hours per charge. And after 2 hours of continuous working, breathing resistance and filtration effect both remain the same. We've developed a mask which can effectively filter out the PM2.5 with low breathing resistance.

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