A Flexible and Robust Sensor for Human Breath Detection

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Abstract

Flexible ionic conductors are interesting materials for next-generation electronics, but it's hard to make a single material that has high toughness, strength, and conductivity. This research presents a high-performance composite film composed of surface-functionalized, carbon-doped boron nitride and polyvinyl alcohol, synthesized using blade casting method. The optimized film has high ionic conductivity while maintain impressive mechanical performance. The high proton conductivity is attributed to the effective proton transport channels formed by optimized hydrogen bonding between functional groups. The film demonstrates an excellent sensing over a wide range of relative humidity, reaching 99.9% sensitivity. For practical application, we successfully showcased its use to track human breathing activity. These results reflect the potential of our device as a flexible, strong, and highly conductive platform that has a potential to be used in wide range of sensing applications.

References

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Figures

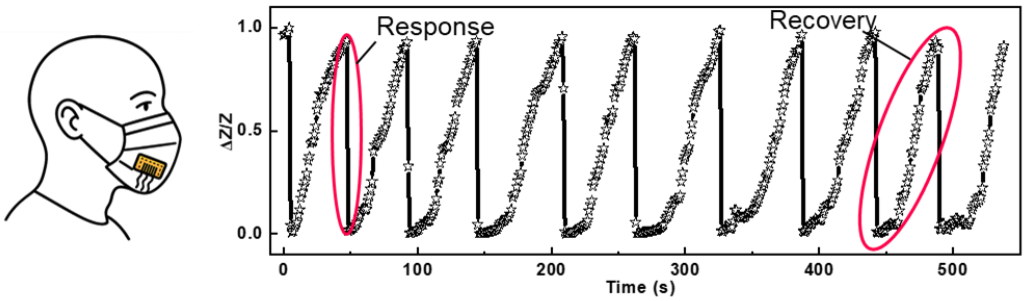

Figure 1: Human breath monitoring by observing the changes in impedance