

Capacitive type humidity sensor based on PANI decorated Cu-ZnS porous microspheres

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حاممة قط **QATAR UNIVERSITY**

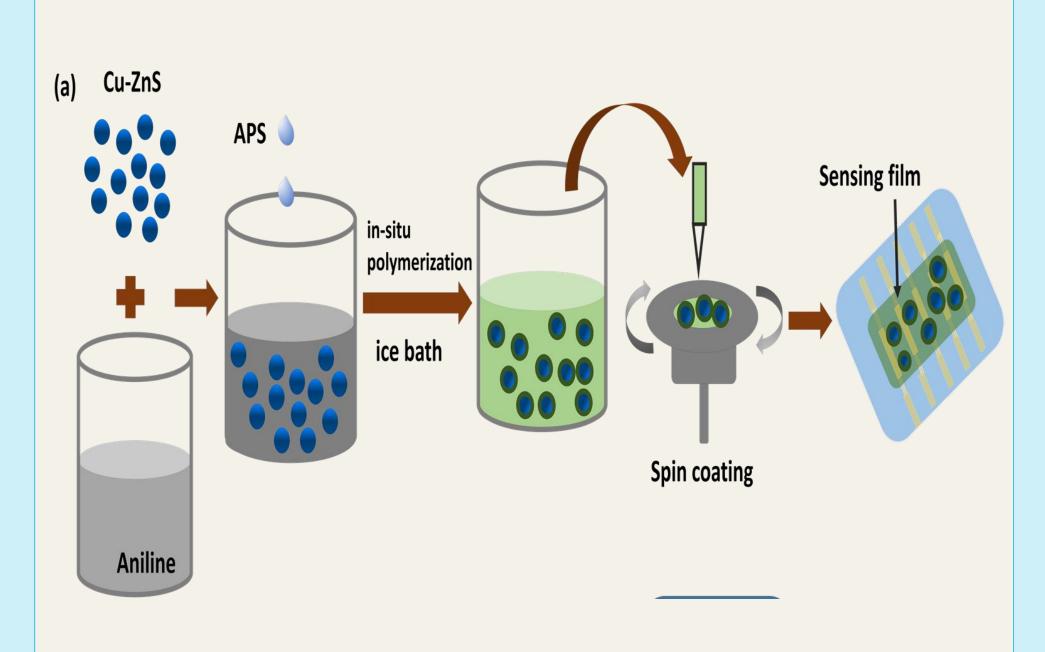
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Introduction

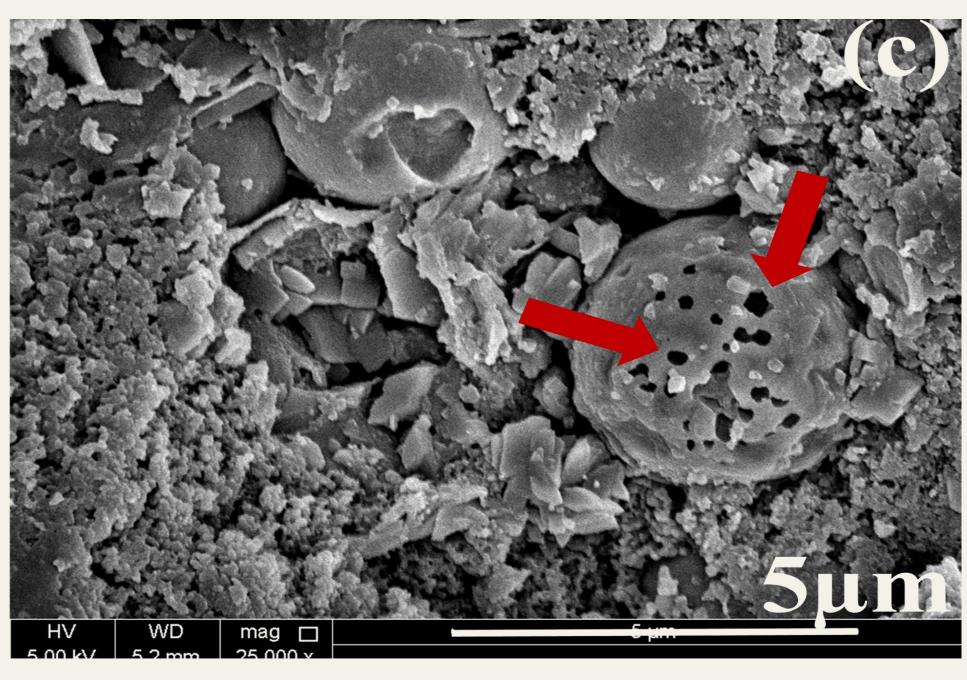
- Humidity sensors are widely used environmental monitoring, particularly in the human comfort zones, as well as in environment industrial of monitoring manufacturing processes.
- The most widely studied materials for humidity sensors are based on metal oxides due to their several properties unique including durability, mechanical and thermal stability.
- •The humidity sensor fabricated from PANI/1% Cu-ZnS composite films have shown high sensitivity, quick response and recovery times.

Fabrication of PANI/Cu-ZnS thin film



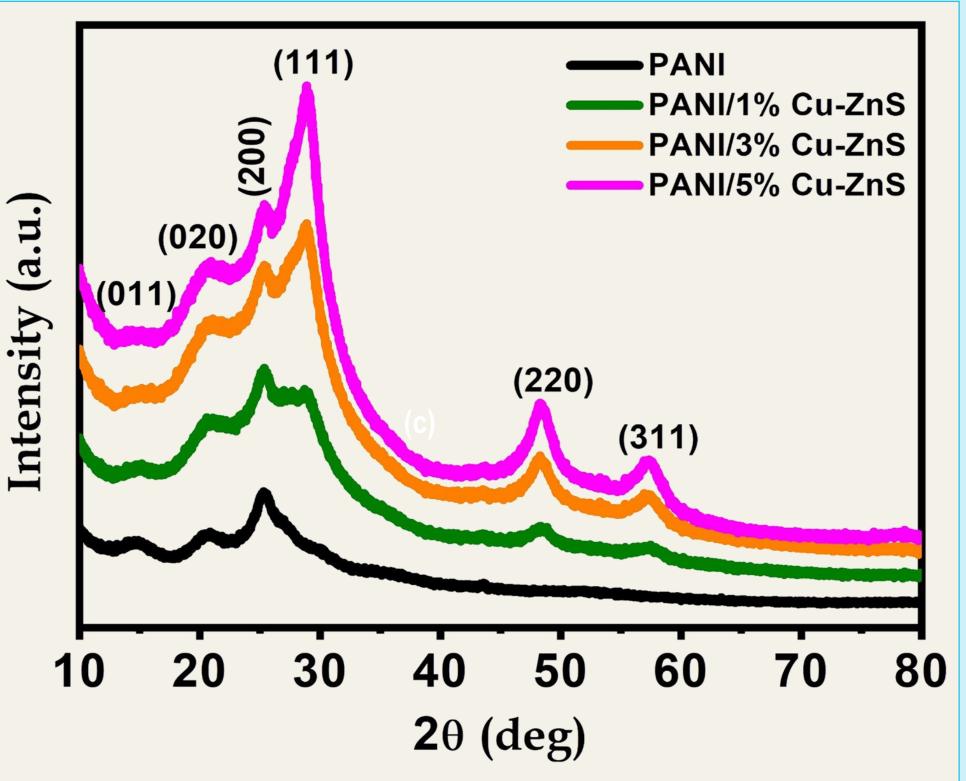
Surface morphology





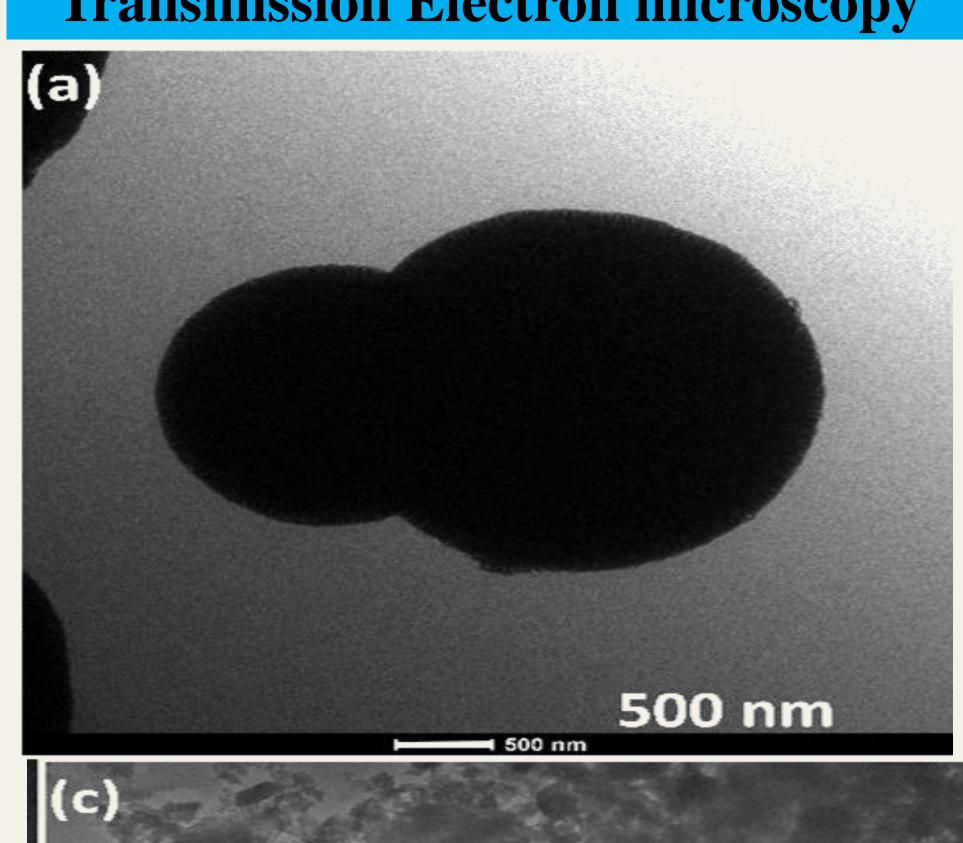
SEM images Cu-ZnS, (b) of (a) PANI/Cu-ZnS.

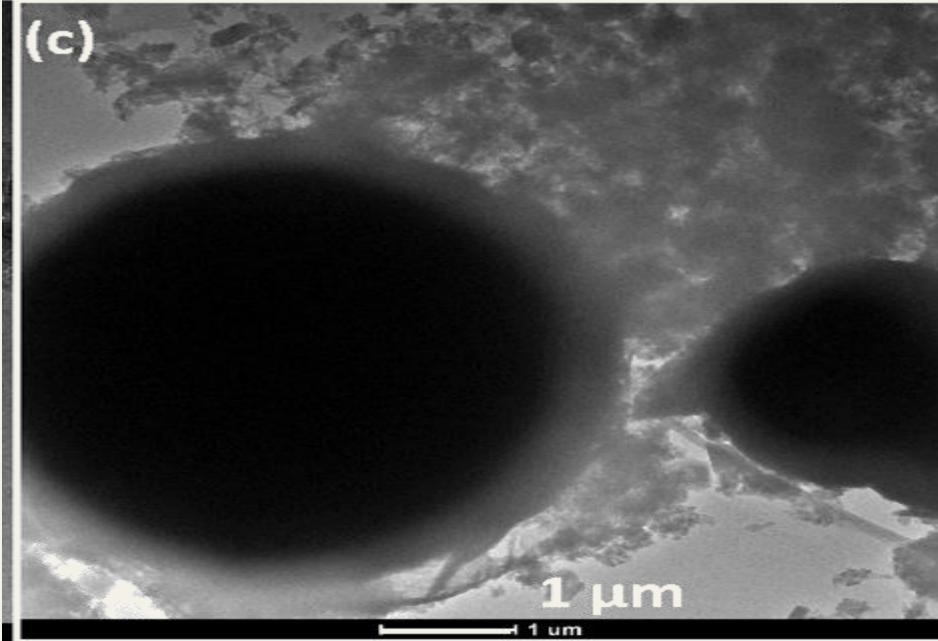
Structural properties



XRD pattern of pure PANI and its composites.

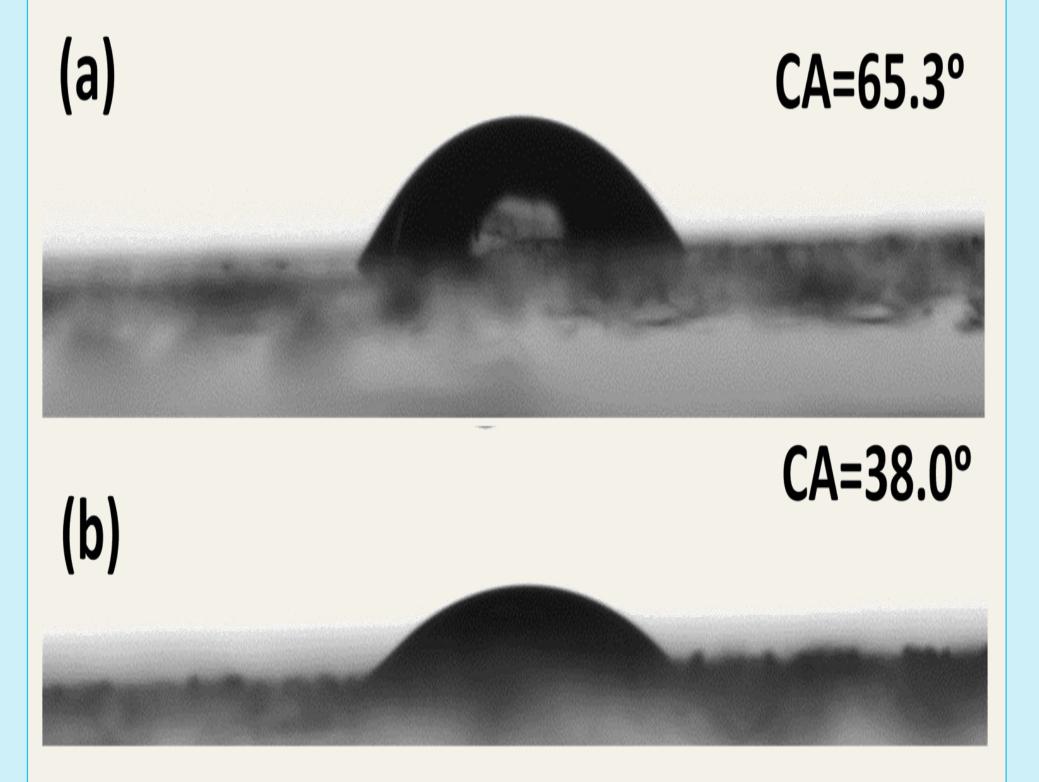
Transmission Electron microscopy





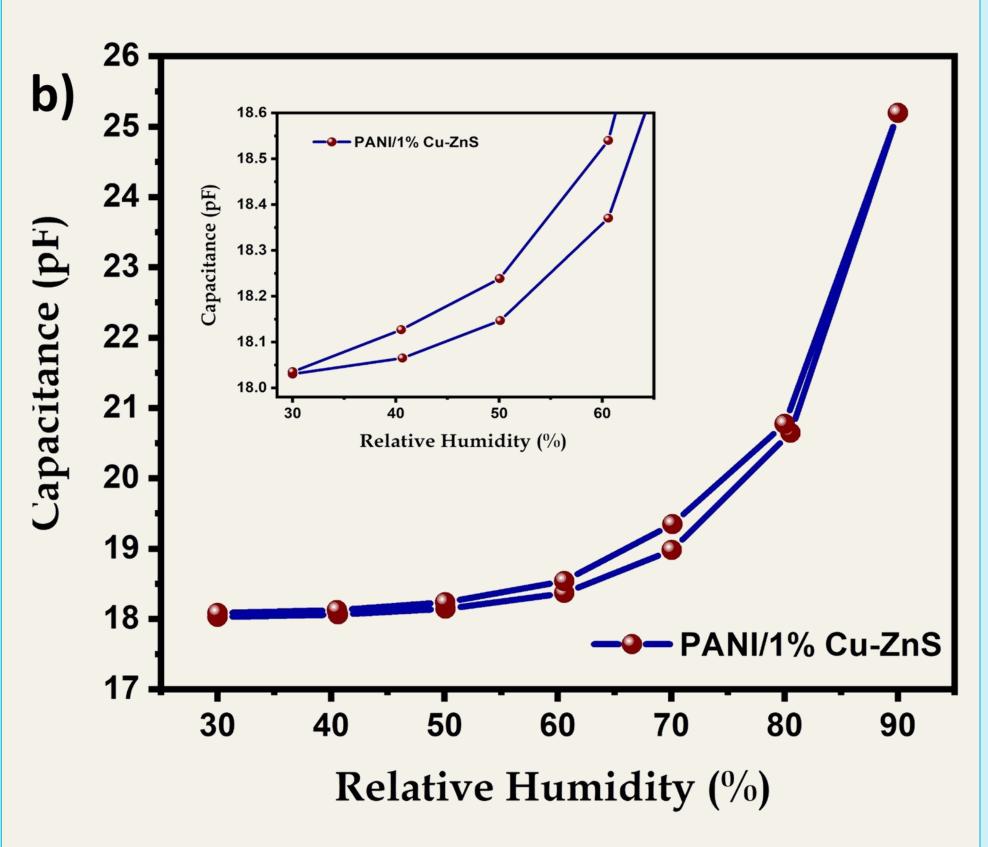
TEM imgaes of (a) Cu-ZnS, (b) PANI/Cu-ZnS.

Surface Wettability

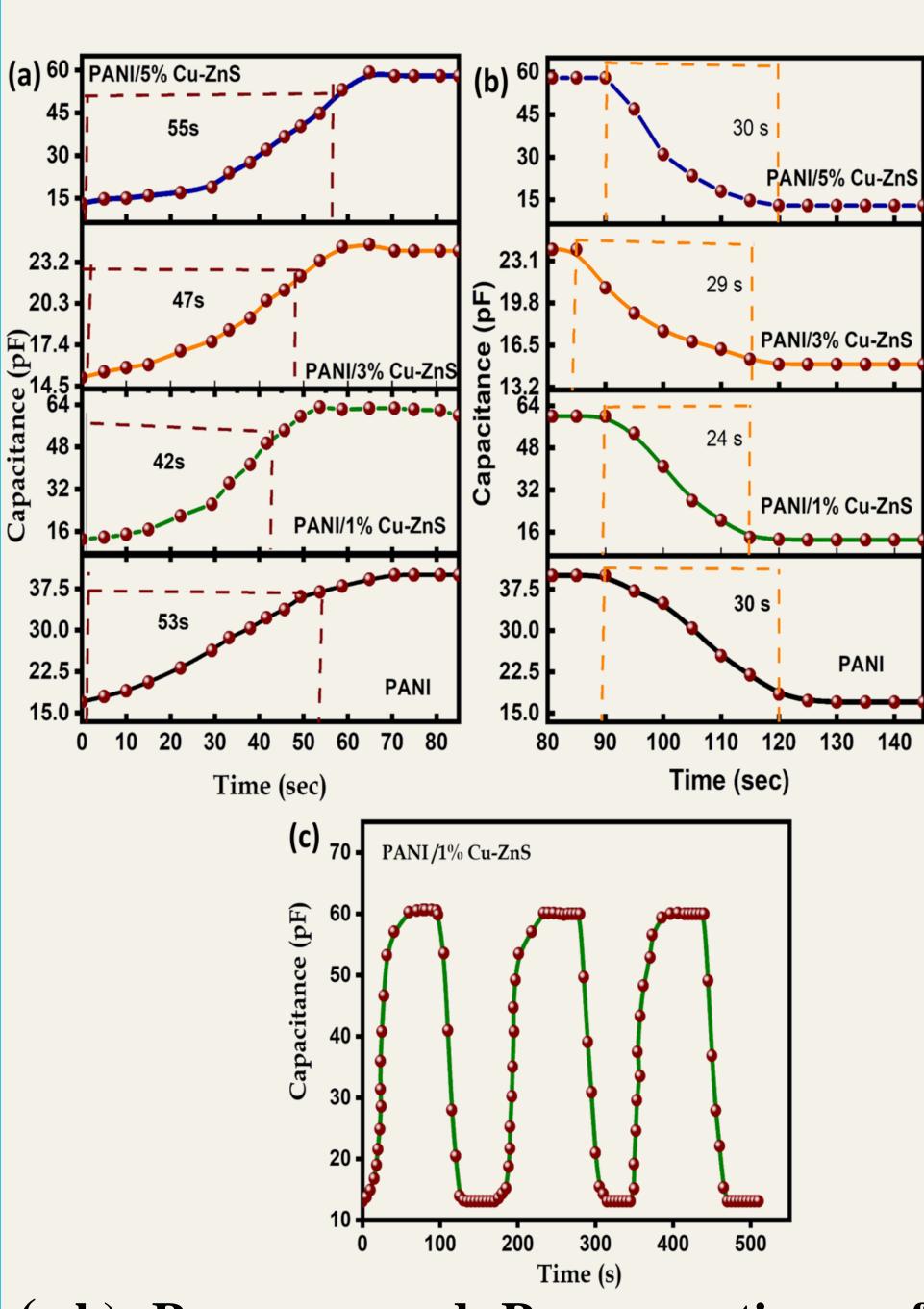


Water contact angle of (a) Cu-ZnS, (b) PANI,

Humidity sensing properties



Hysteresis of PANI/Cu-ZnS composites.



(a,b) Response and Recovery times of **PANI** its composites, (C) and PANI/Cu-ZnS Repeatability of composite.

Conclusion

- In this work, PANI/Cu-ZnS composite based humidity sensor are prepared through in situ-polymerization and hydrothermal method.
- Among, all the composites, PANI/1% Cu-ZnS exhibited the best response and recovery behavior, which exhibits very low hysteresis of ~1.2%RH with good stability. Also, response and recovery times of the fabricated PANI/Cu-ZnS structures as low as 42s

Acknowledgement

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