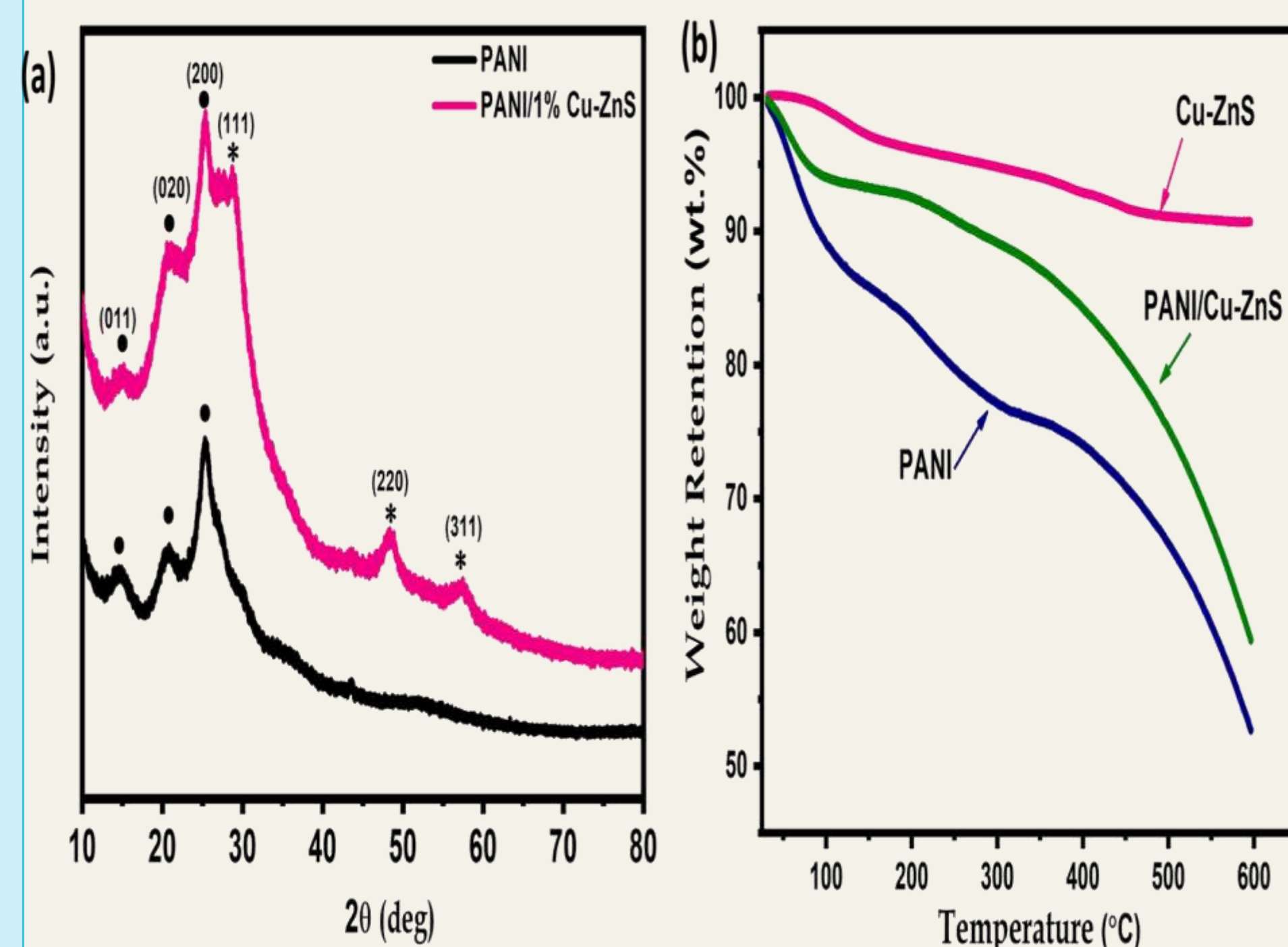


Introduction

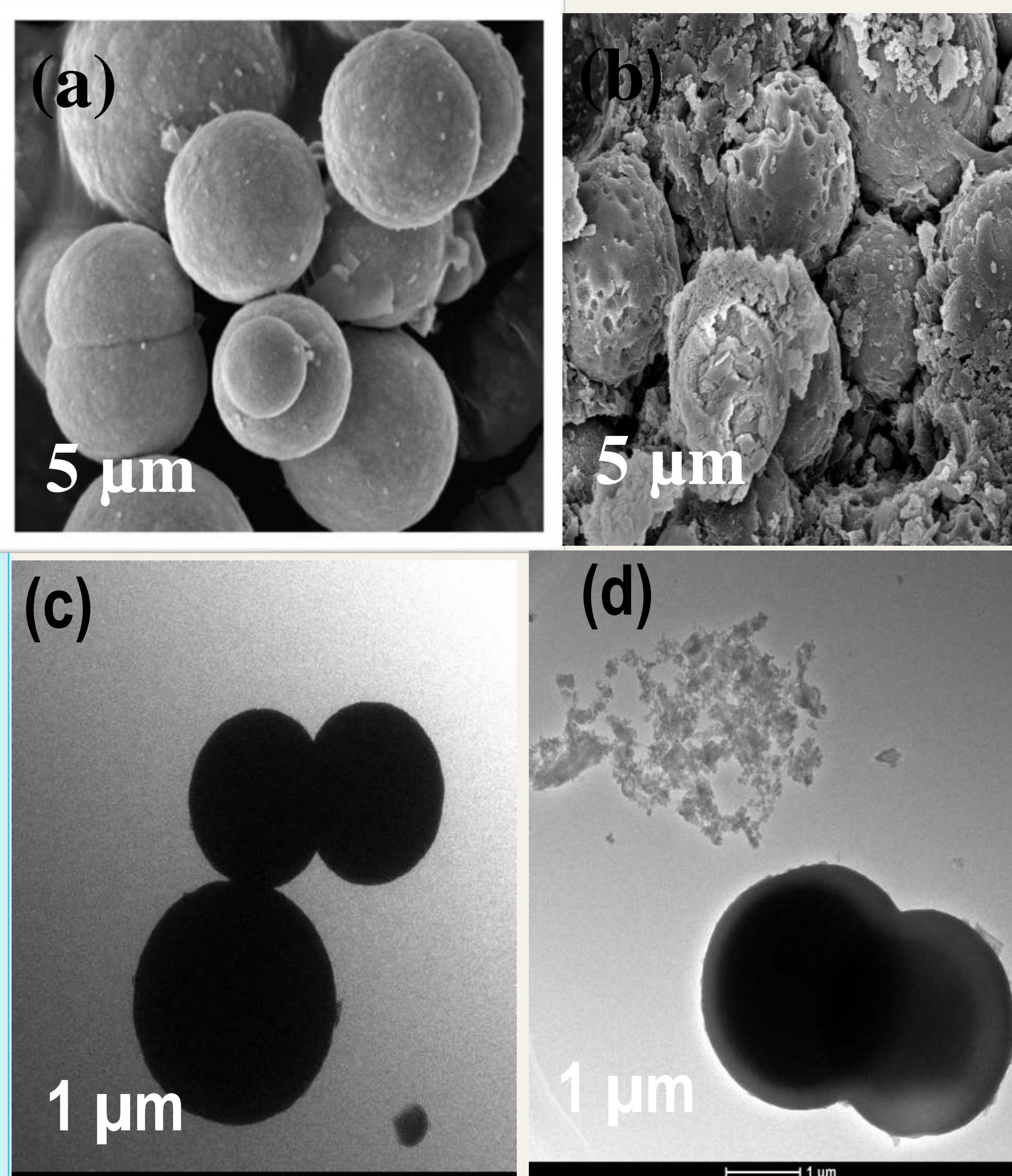
- The monitoring of carbon dioxide (CO₂) is particularly vital for greenhouses, air-quality, food packaging and to maintain the healthy environment.
- Carbon dioxide (CO₂) is one of the primary greenhouse gasses, which leads to the adverse effects on the environment. Also, the monitoring of CO₂ level is very crucial in the greenhouses, where the growth of plants directly depends on the CO₂ concentration.
- In this work, we prepared the PANI coated Cu-ZnS microsphere composite for the potential application in CO₂ sensing. PANI/Cu-ZnS porous microspheres were prepared by in situ-polymerization method.

Structural properties



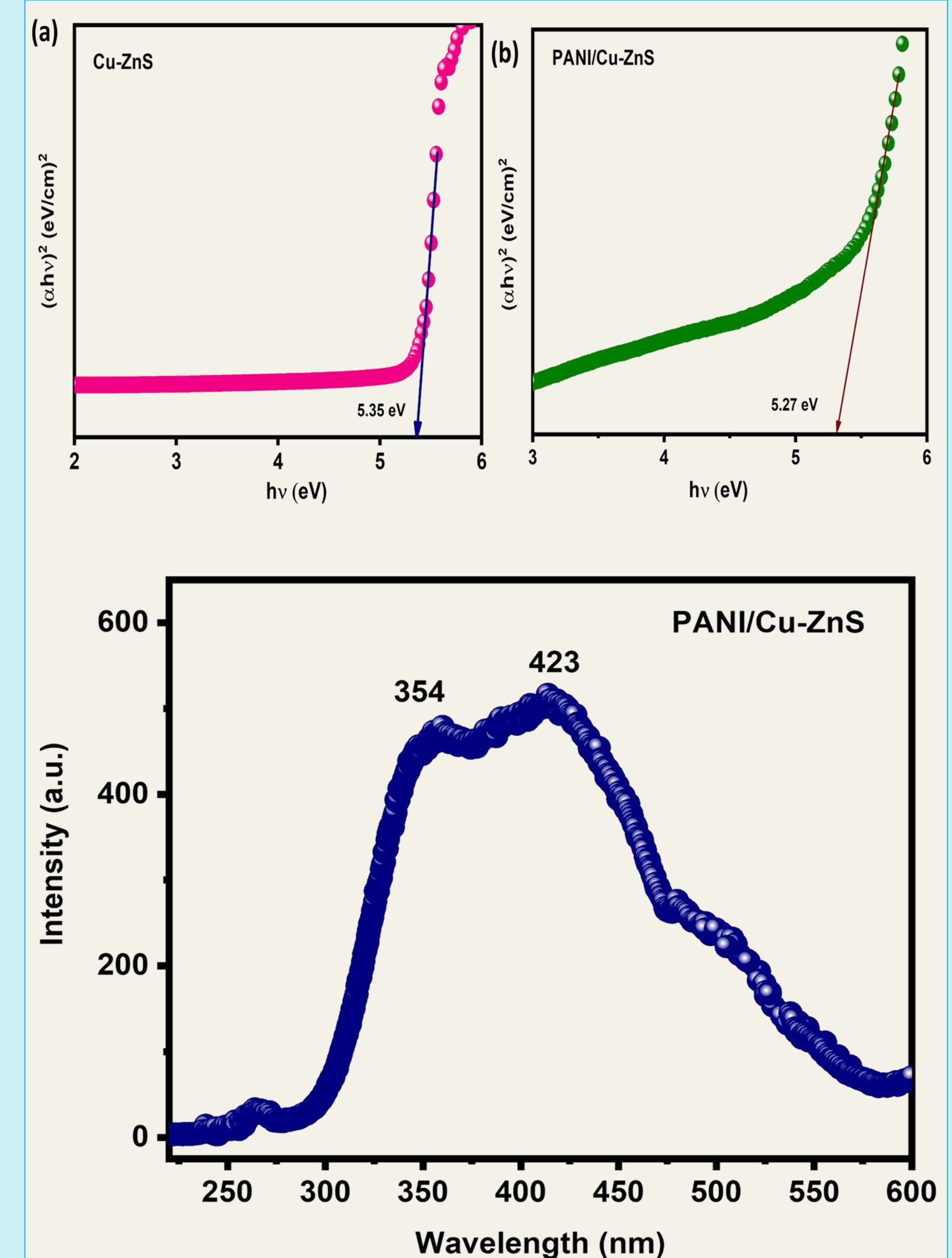
(a) XRD patterns of Pure PANI and PANI/Cu-ZnS composite, (b) TGA curves of PANI, Cu-ZnS and PANI/Cu-ZnS composite.

Morphology

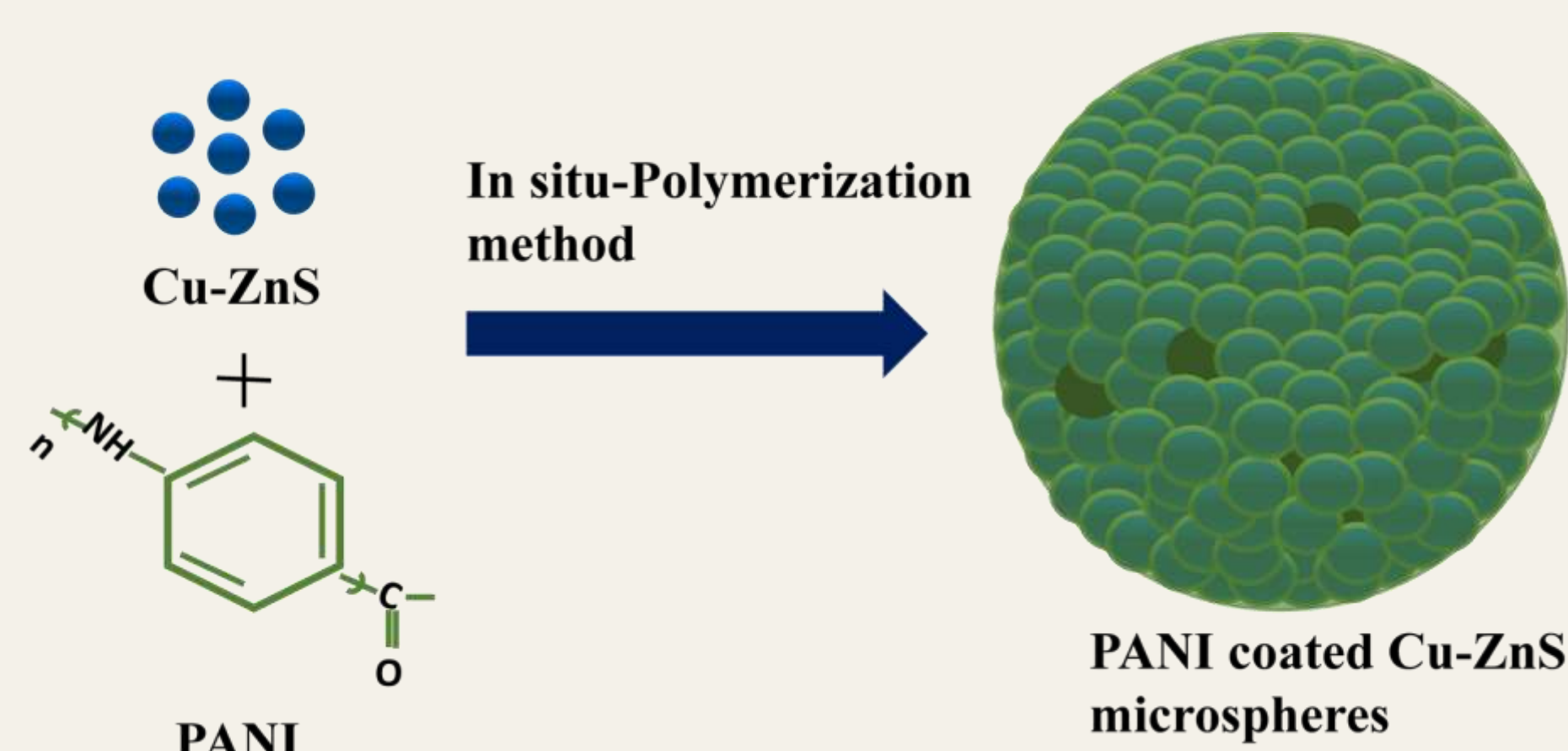


SEM and TEM images of pure PANI and PANI/Cu-ZnS composite.

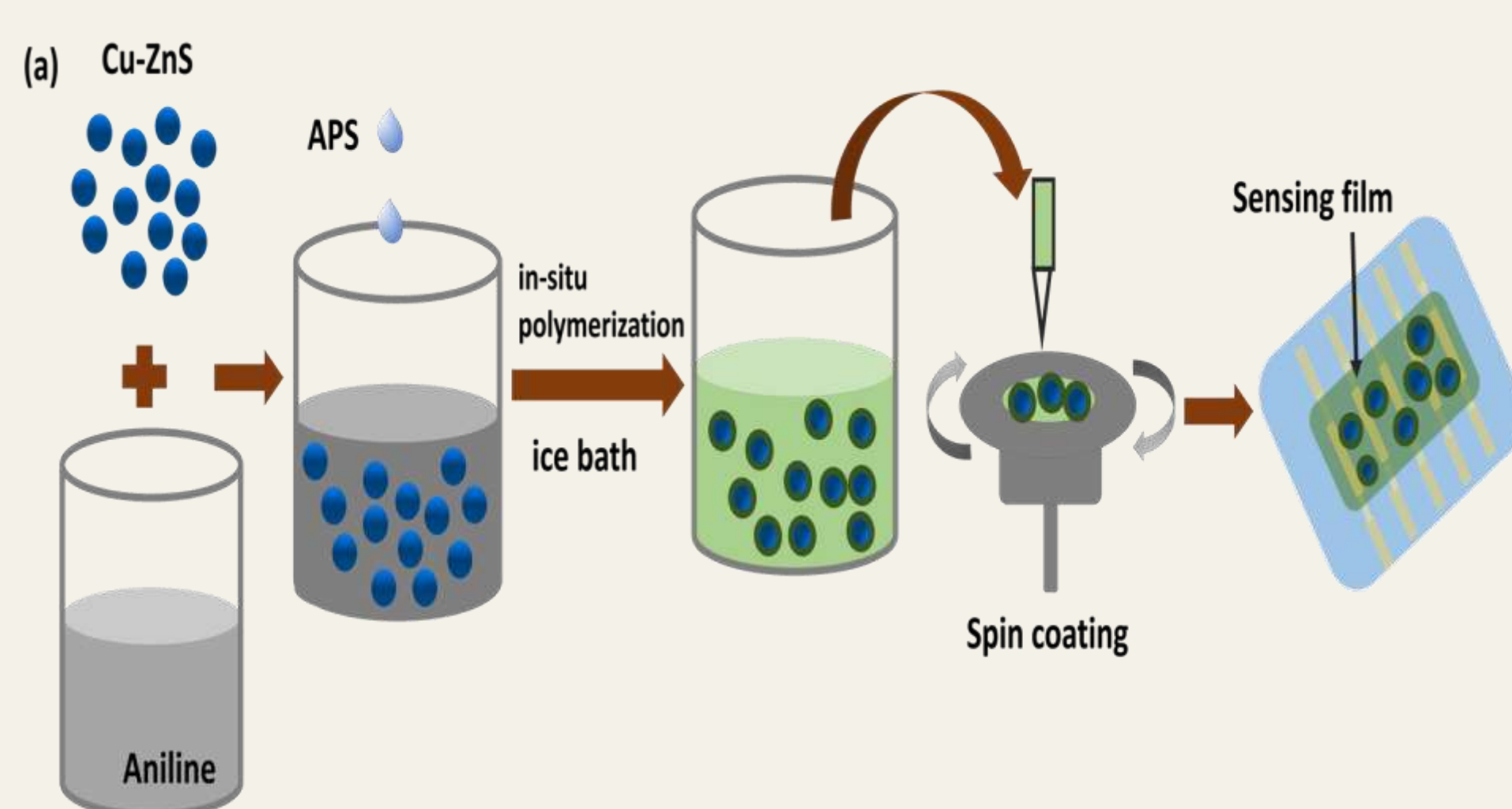
Band gap measurements



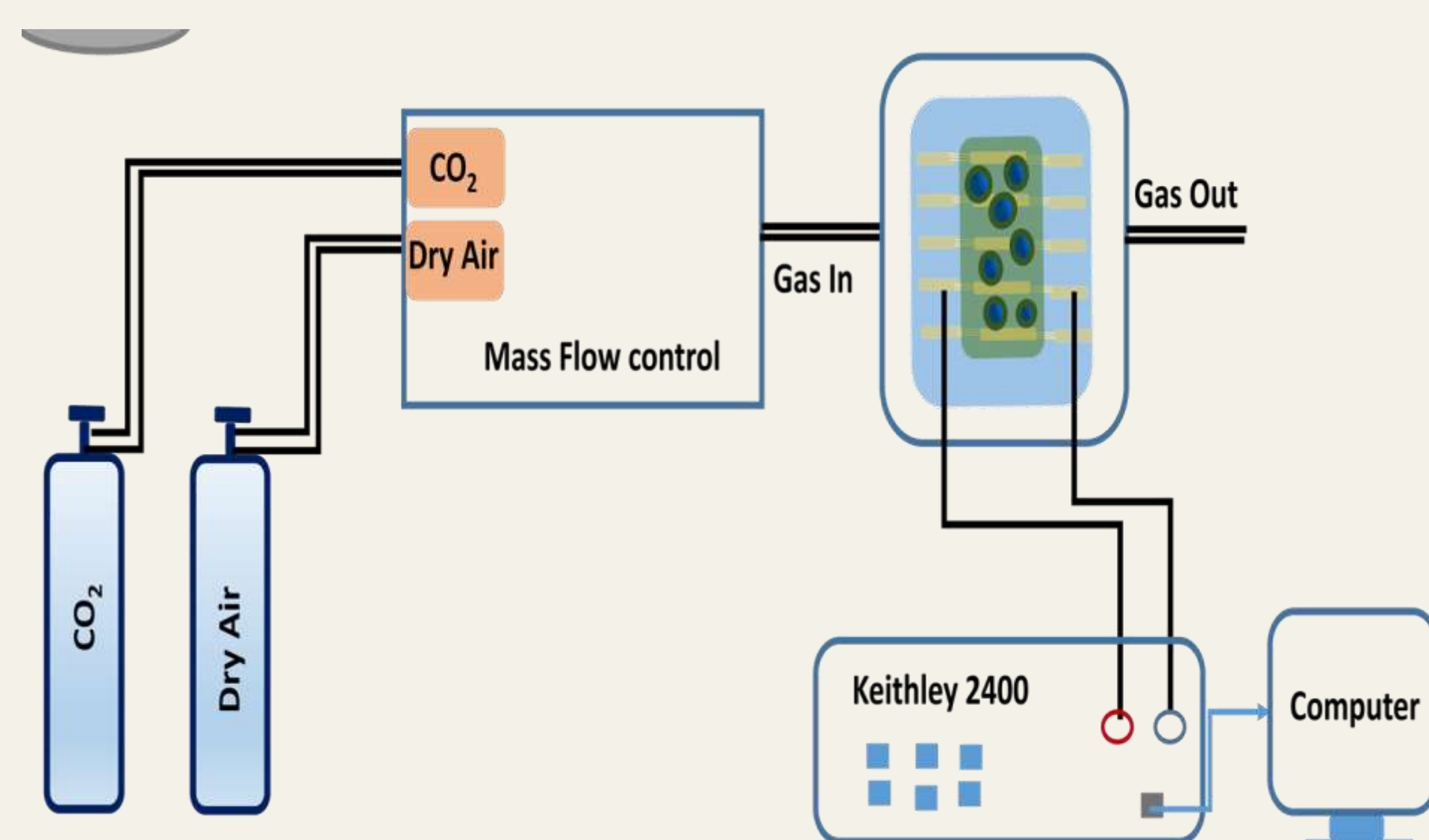
Synthesis of PANI composite



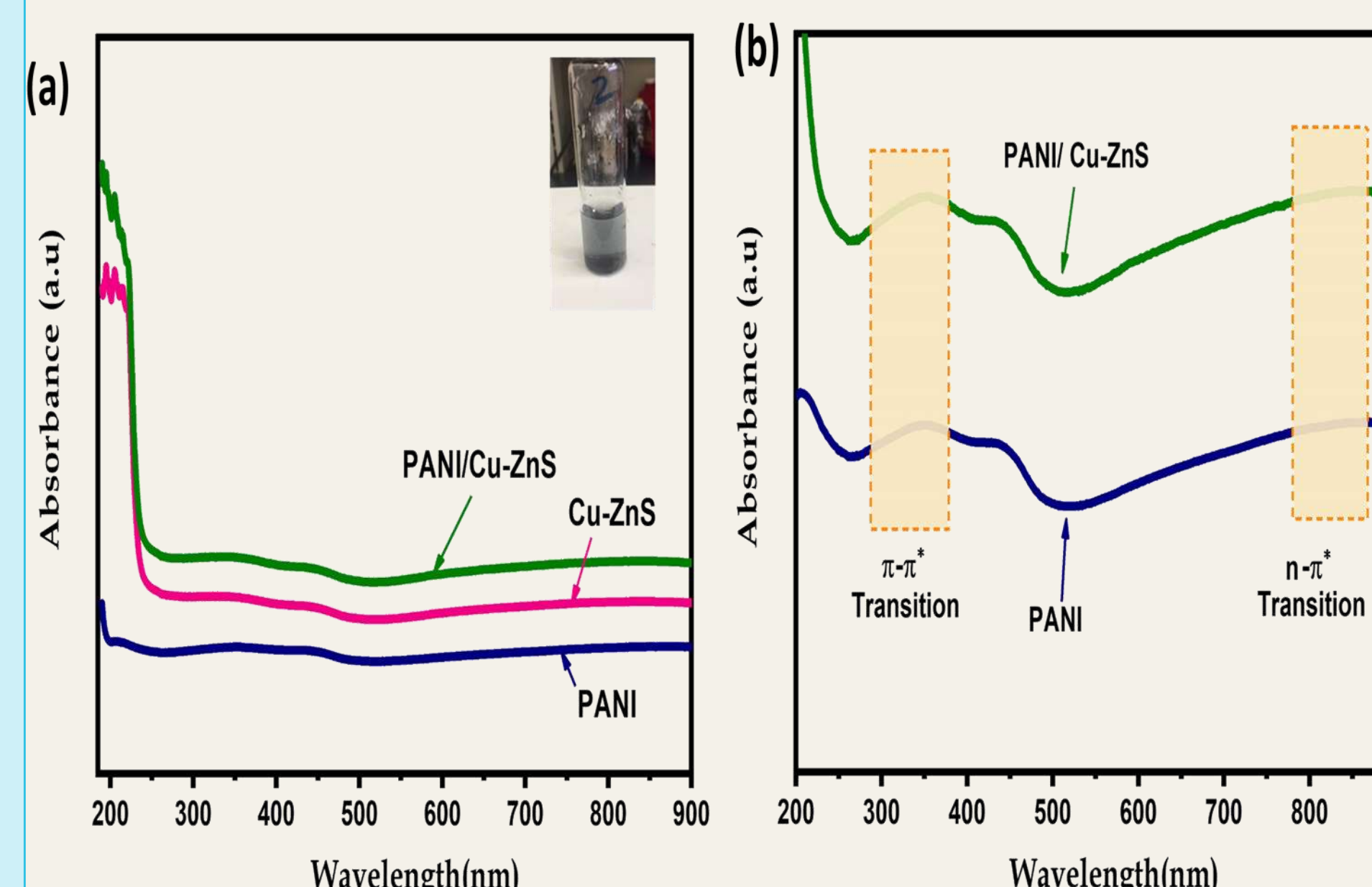
Fabrication of PANI/Cu-ZnS thin film



Gas sensor setup

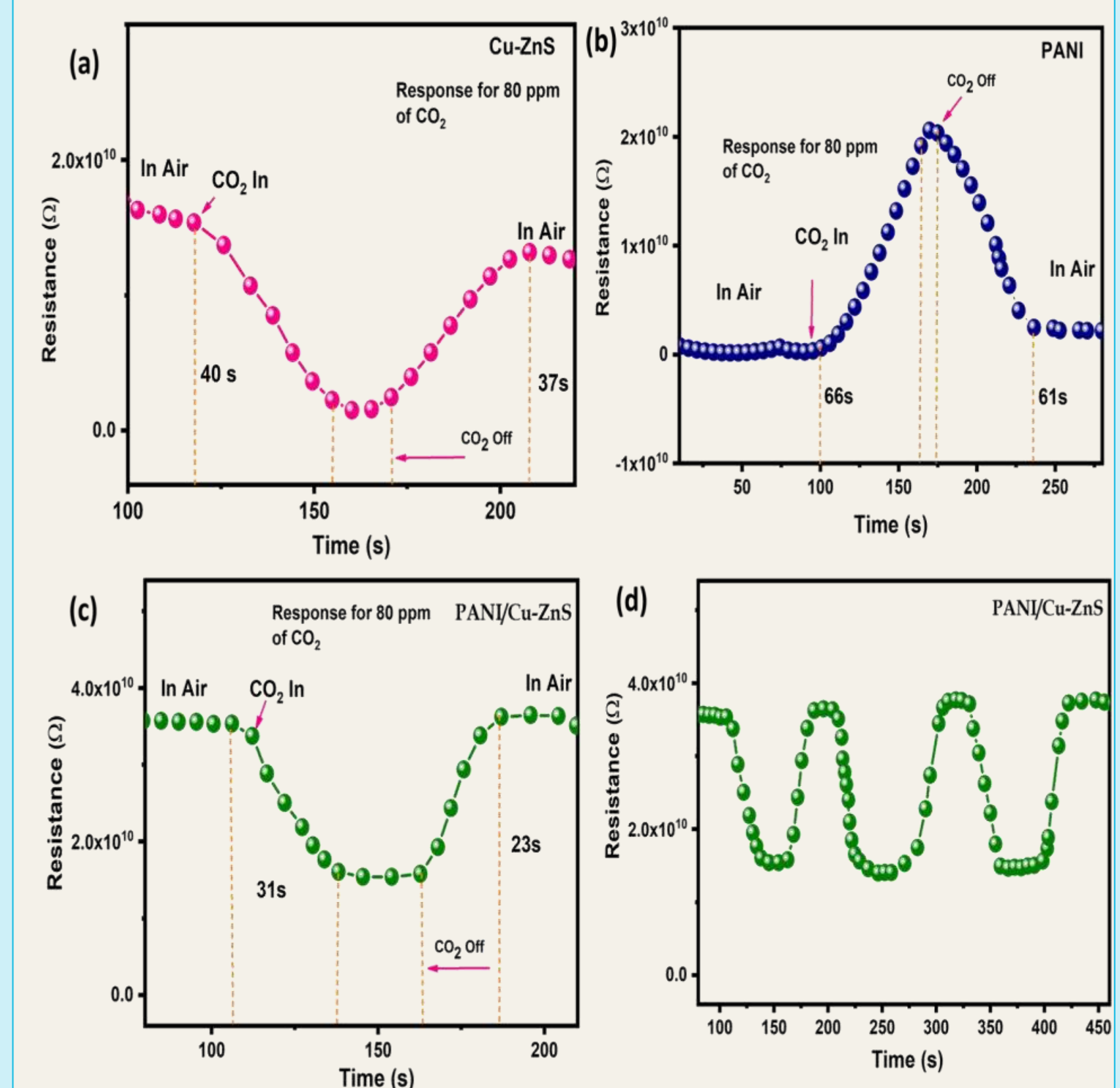


Optical properties



(a, b) UV-vis absorption spectra of pure PANI and PANI/Cu-ZnS composite.

Gas sensing properties



CO₂ sensing response of (a) Cu-ZnS, (b) PANI, (c) PANI/Cu-ZnS, (d) Repeatability curve.

Conclusion

- PANI coated Cu-ZnS microspheres with unique surface morphology were synthesized.
- The porous microsphere composite exhibits quick response and recovery behavior and good reproducibility towards the CO₂ sensing. The response and recovery times are 31 s and 23 s.

Acknowledgement

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