

# Graphene Nanoporous Membranes with ZrO<sub>2</sub>-based Nanoparticles for Gas Separation

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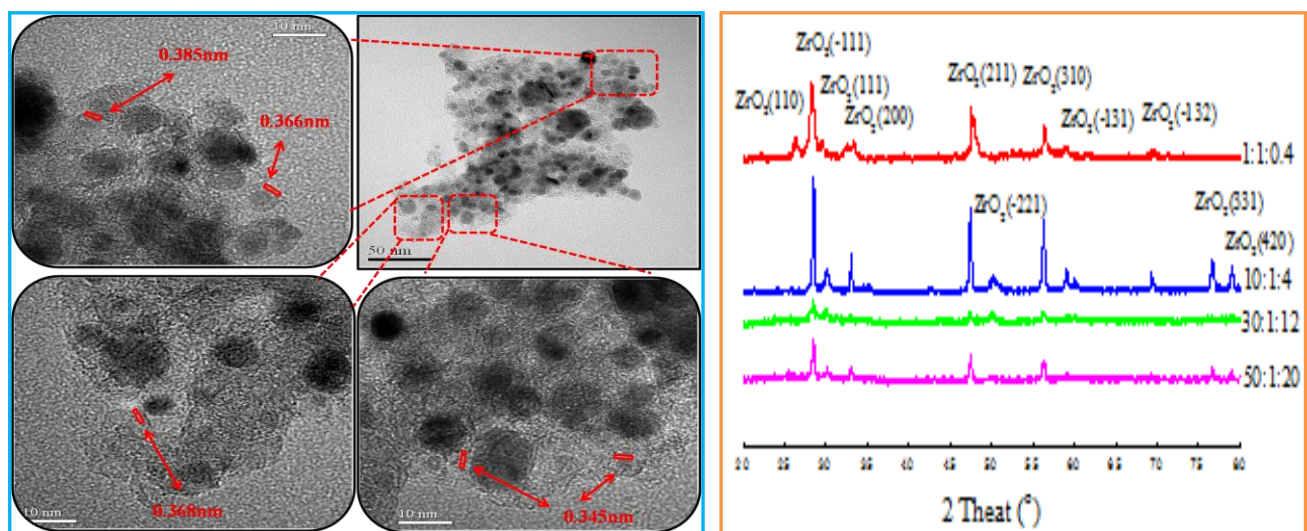
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**Abstract:** Graphene coated nanopores membranes with zirconium dioxide based nanoparticles were prepared by carbonization of the nano-technical ones. Gas permeation performance of the above membranes was evaluated and compared to performance after doping the membranes with these nanoparticles introduced into the membranes as fillers and acting as functionally active materials. The addition of n-ZrO<sub>2</sub> nanoparticle fillers to porous-based to form mixed matrix membranes can affect gas mixture separation owing to variation of magnetic susceptibility. The nano-composites coped with the different gas molecules and variable interaction with the dispersed magnetic fillers can also show higher molecular sieved capacity and well dispersion ability to alter the separation selectivity. The properties of the resulting materials were evaluated and the permeation effect using a series of gas molecules as well as being conducted. The results indicated that the introduced the nanoparticles performed the gas permeance and separation properties of the composite nano-membranes.

## REFERENCES

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## FIGURES



**Figure 1:** As-synthesized TEM images of graphene nanoporous nanocomposite (left) and XRD results (right) for the applying on the functional gas membranes.