Title: Modulating and Tuning Relative Permittivity of Dielectric Composites at Metamaterial Unit Cell Level for Microwave Applications

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Highlights

- PP/TiO_2 nanocomposites with ε_r in the range of 2-7 and low loss were fabricated.
- Further tuning of ε_r was achieved by drilling holes based on metamaterial concept.
- The resultant ε_r on 5×5×5 mm^3 unit cells conformed well to the simulation results.
- A scheme to implement a dielectric GRIN lens with varying ε_r is presented.