Abstract

Title: **Functional Ceramics in 3D-printed Applications**

3D printing enables the practical use of zinc oxide (ZnO) tetrapod-based 3D-printed functional ceramics, translating their unique properties into real-world applications. ZnO's antibacterial, high-surface-area microstructure is ideal for advanced energy and biomedical devices but difficult to utilize without a precise shaping tool. In energy applications, 3D-printed ZnO-MOF composites create selective hydrogen sensors crucial for renewable energy systems, allowing accurate detection in mixed-gas environments like natural gas pipelines.

In medicine, 3D-printed ZnO scaffolds provide patient-specific wound care solutions, using ZnO's antibacterial properties to support healing. Customized geometries conform to individual wounds, releasing growth factors on demand, which accelerates recovery with minimal cytotoxicity. This technology transforms ZnO's nanoscale advantages into scalable, patient-centered applications across diverse fields.

This talk will give an overview over the mutual benefits arising from a complex micro-architecture coupled with the advanced fabrication technique of 3D printing.

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