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## Preparation of zirconium-based porous ultra-high temperature ceramics via sol-gel precursors

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Ultra high temperature ceramics (UHTCs) are a class of inorganic materials that have melting point over 3000 °C and are typically borides, carbides and nitrides of early transition metals. UHTCs are considered as the promising candidate used in the extreme environment involved with the hypersonic aviation thermal protective system. Synthesis of UHTC based materials can be divided into solid based and solution based protocols according to the state of the raw materials. Sol-gel process is one of the solution based protocols for the preparation of UHTC based materials, which involves the hydrolysis, condensation of the metal organic and/or metal inorganic compounds, gelation and the post high temperature treatment of the dried gels. Here, we present the preparation of several zirconium-based porous UHTCs. The formation and manipulation of the pore structure and the correlation to their properties are also discussed.

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