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inorganic materials, bio- and bio-inspired materials, powders, particles and fibers as well as sol-gel derived thin films, coatings and surfaces.

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The Sol-Gel Handbook: Synthesis, Characterization, and ... A gel consists of a porous, threedimensionally continuous solid network surrounding and supporting a continuous liquid phase (" wet gel "). In most sol – gel systems for the synthesis of oxide Page 22/34

materials, gelation (i.e., formation of the gels) is due to the formation of covalent bonds between the sol parti-cles. Gel formation can be reversible when other bonds are involved, such as van der Waals forces or hydrogen bonds.

Part One Sol Gel Chemistry and Methods
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Sol-gel synthesis of metal oxide can be done at relatively low temperature compared to the solid-state reactions. In general, sol-gel process involves formation of sol from homogeneously mixed...

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reactions: (1) hydrolysis of the precursor in the acidic or basic mediums and (2) polycondensation of the hydrolyzed products. In this way a polymeric network is formed in which MNPs can be retained [126]. View chapter Purchase book. Read full chapter.

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This process can be summarized in six steps: (1) the formation of a stable metal precursor solution referred to as "sol"; (2) the formation of a "gel" through a polycondensation reaction; (3) the aging of the gel for hours or days, resulting in the Page 28/34

expulsion of the solvent, i.e., Ostwald ripening, and the formation of a solid mass; (4) the drying of the gel of any liquids; (5) dehydration and surface stabilization; and (6) heat treatment of the gels at high temperatures to generate ...

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clarify in extensive detail properties and applications of sol-gel science and technology as it pertains to the production of substances, active and non-active, including optical, electronic, chemical, sensor, bio- and structural materials.

Handbook of Sol-Gel Science and Page 32/34

Technology Processing ... And Alkoxides are ideal chemical precursors for sol – gel synthesis because they react readily with water. The reaction is called hydrolysis, because a hydroxyl ion becomes attached to the silicon atom as follows: Si (OR) 4 + H 2 O HO – Si (OR) 3 + R - OHPage 33/34

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