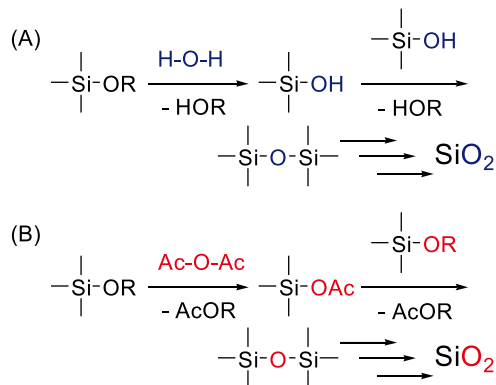


Novel Synthesis of Sol-Gel Silica in Organic Solution

Silica solid is prepared by a novel sol-gel type method using silane alkoxide and acid anhydride instead of water. This synthetic procedure is performed in organic solution media, which is advantageous to make homogeneous systems of the precursors of silica and organic compounds. This procedure readily produced an epoxy resin/silica nanocomposite material, which had no Tg point under 300 °C. On the other hand, when silica was prepared in the presence of dissolving cholesterol, silica obtained adsorbed steroid hormones such as progesterone more predominantly than other analogous compounds, probably due to the molecular imprinting effect of cholesterol.



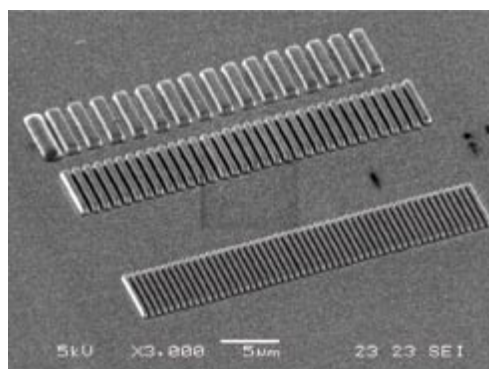
Conceptual schemes of (A) common and (B) developed sol-gel methods

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Micro/Nano Hot Embossing Pyrex Glass with Glassy Carbon Mold fabricated by Focused-Ion –Beam Etching

Micro/Nano imprinting or hot embossing is a target of interest for industrial production of micro devices. In Fluidic MEMS (Micro Electro Mechanical Systems) applications, polymer materials have been employed for their low cost fabricate the economical products . However glasses are much more suitable for the higher temperature applications or under strong chemical environments. In Optical MEMS as well, glasses are good candidate materials for better optical properties. In this study, Micro/Nano hot embossing was employed for Pyrex glass molding and the test structures were successfully fabricated with good fidelity of 0.3µm line and space and 0.4µm height.



SEM images of hot embossed Pyrex micro structures 1µm, 0.5µm,300nm line and spaces (Temp.:590 °C, Press.:0.22MPa, Keeping time:60sec).

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