

**A Purified Sol-Gello Approach to the
Synthesis of Nanocrystalline Spinel**
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A sol-gello method was developed for the synthesis of spinel (MgAl_2O_4). Spinel can be formed directly by combining Al_2O_3 and MgO , but this method is expensive and demands temperatures of $1450\text{-}1600^\circ\text{C}$. In our approach, an ion-exchange purification method is implemented to rid the gelatin of impurities. Magnesium and aluminum salts are added to the gelatin, ensuring that the metal ions are trapped in a homogeneous distribution. The gelatin content controls the particle size, product reactivity, and microstructure. Ammonia is subsequently used to hydrolyze the gels creating amorphous solids. The spinel phase begins to crystallize from the low and high-gelatin content amorphous solids at a temperature as low as 420°C . Due to the gelatin purification, only the spinel phase is present at higher temperatures. The synthesis and characterization of nanocrystalline spinel with this method will be discussed.