

# Enhancement of Sol-based Ceramic Shell Moulds for Application of Investment Casting Process for Al-Alloys

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## ABSTRACT

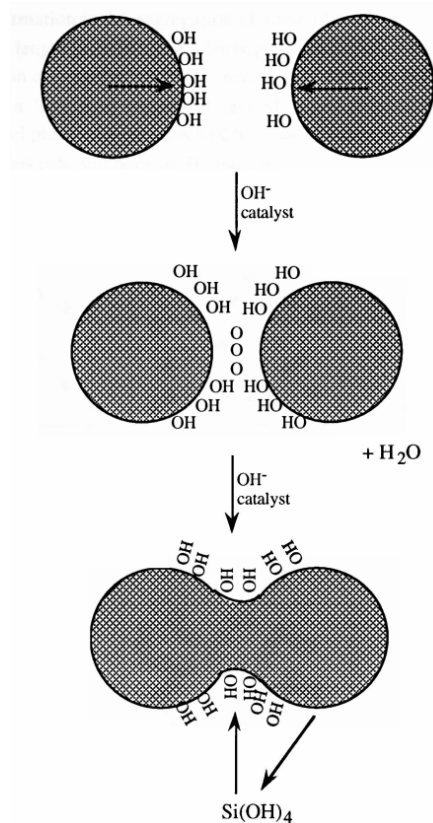


Figure 1: Bond formation between silica particles.

A research has been carried out into the mechanisms of failure of colloidal silica bonded ceramic shell moulds, with the aim of reducing failure rates for larger Al-alloy components. The structure and distribution of the binder is recognized and this indicates that the major load bearing zones within the shell mould consist of thin areas of silica. The overall performance of the mould is directly related to that of the silica itself. This binder is shown to contain impurity elements leached from the ceramic filler at various stages during shell mould preparation. Shell mould temperature profiles for a range of casting sizes have been measured and used to exemplify the relationship between metal weight and maximum temperature attained within the shell mould section.

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