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# Low-Temperature Silanization of Medical Vials: Chemical Bonding and Performance

**Authors :** Yuanping Yang, Ruolin Zhou, Xingyu Liu, Lianbin Wu

**Abstract :** Based on the challenges of silanization of pharmaceutical glass packaging materials, the silicone oil high-temperature baking method consumes a lot of energy; silicone oil is generally physically adsorbed on the inner surface of the medical vials, leading to protein adsorption on the surface of the silicone oil and fall off, so that the number of particles in the drug solution increases, which brings potential risks to people. In this paper, a new silanizing method is proposed. High-efficiency silanization is achieved by grafting trimethylsilyl groups to the inner surface of medical vials by chemical bond at low temperatures. The inner wall of the vial successfully obtained stable hydrophobicity, and the water contact Angle of the surface reached 100°~110°. With the increase of silicified reagent concentration, the water resistance of corresponding treatment vials increased gradually. This treatment can effectively reduce the risk of pH value increase and sodium ion leaching.

**Keywords :** low-temperature silanization, medical vials, chemical bonding, hydrophobicity
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