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**Preparation of Bismuth Stannate/Silver@Silver Chloride Film
Samples with Enhanced Photocatalytic Performance and
Self-cleaning Ability**

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Abstract

We report a novel technique to fabricate bismuth stannate/silver@silver chloride ($\text{Bi}_2\text{Sn}_2\text{O}_7/\text{Ag}@\text{AgCl}$) films on conventional glass substrates. The film exhibited a remarkable self-cleaning capability against organic dyes under visible light. Porous $\text{Bi}_2\text{Sn}_2\text{O}_7$ (BSO) film was first sintered on a glass substrate, followed by implantation of AgCl in it and photo-induction to produce $\text{Ag}@\text{AgCl}$. The degradation of organic dyes and photoelectrochemical studies indicate that, compared with BSO film, $\text{Bi}_2\text{Sn}_2\text{O}_7/\text{Ag}@\text{AgCl}$ film had a much improved photocatalytic ability, probably due to the enhanced electron transfer efficiency and synergistic effect of visible light absorption of the two semiconductors. The possible mechanism of this marked improvement was investigated and interpreted in terms of electrons and holes separation efficiency and charge circulation routes at the interfaces within the $\text{Bi}_2\text{Sn}_2\text{O}_7/\text{Ag}@\text{AgCl}$ composite film. The film provided in this study may well have practical applications due to its simplicity of preparation, excellent photocatalytic

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