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Surface-Enhanced Raman Scattering of 4-Aminothiophenol Adsorbed on Silver Nanosheets Deposited onto Cubic Boron Nitride Films

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A simple method was found for the fabrication of silver nanosheets (AgNS) by the catalysis of gold nanoparticles (AuNP) on an amine-terminated cubic boron nitride (cBN) surface deposited on a Si(001) substrate in the presence of reductant. The morphology of the AgNS/AuNP/NH₂-cBN/Si(001) sample was characterized by scanning electron microscopy and X-ray diffraction. The performance of the AgNS/AuNP/NH₂-cBN/Si(001) sample as surface-enhanced Raman scattering (SERS) active substrate was evaluated by using 4-aminothiophenol (PATP) as the probe molecule. The SERS measurements showed that the maximum intensity was obtained on the AgNS/AuNP/NH₂-cBN/Si(001) sample for 5 min silver deposition. Compared with the AuNP/NH₂-cBN/Si(001) sample and a silver film/cBN/Si(001) prepared by the mirror reaction, the SERS signal of PATP was obviously improved on the above AgNS/AuNP/NH₂-cBN/Si(001) film. The sensitivity and the stability of the AgNS/AuNP/NH₂-cBN/Si(001) sample were also investigated.

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