

Growth Factors for Silver Nanoplates and Nanobelts Formed in a Solvothermal Process

루치¹, 이근재², 홍성재³, 김희택^{1,2}, 좌용호^{1,2,*}

¹한양대학교 바이오테크놀로지학과; ²한양대학교 정밀화학공학과; ³전자부품연구원
(choa15@hanyang.ac.kr*)

Recently, silver nanoplates have drawn much attention because of their unique optical and other properties. We synthesized both big and ultra-small silver nanoplates through a simple solvothermal process in an autoclave. Using this approach, we achieved the reduction of silver nitrate in DMF in the presence of PVP as a capping agent. Growth factors such as the concentration of silver precursor, quantity of capping agent, reaction time, and temperature have been shown to play important roles in the formation of different sizes and shapes of silver nanoplates. The big plates, over 100 nm in edge length, were found mainly in the connected triangular shape. Some of the products were mixed with nanobelts and other novel shapes. Single triangle, truncated triangular, and hexangular plates were also successfully synthesized under the different reaction conditions. These plates were produced at high concentration. The small silver nanoplates, 20–100 nm in edge length, were extracted from the solution. The UV-vis spectrum exhibited intense in-plane dipole absorption peaks varying from 470–630 nm, as reflected by the gradual color change of the solution from orange to red, and finally to blue.