Electronic Supplementary Material (ESI)

Cl^--induced selective fabrication of 3D AgCl microcrystals by one-pot synthesis method

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1. Materials and methods

All reagents and solvents were purchased from commercial sources and used as received without further purification. Chemicals used in this study included silver nitrate (AgNO3, A.R. 99.8%, Sinopharm Group Chemical Reagent Co., Ltd., China), nitric acid (HNO3, AR) Hyrochloric acid (HCl, AR) Poly(diallyldimethylammonium chloride) solution (PDDA), ethylene glycol (EG, ⩾99%) was purchased from Aladdin. All chemicals were used as received. The solutions were prepared from super pure water (18 M cm) purified through a Milli-Q Lab system (Nihon Millipore Ltd.).

For a typical synthesis of uniform AgCl crystals, 0.8 mL PDDA and 20 mL ethylene glycol (EG) was added to 50 mL flask and the mixture was stirred vigorously at room temperature for 1 minute to mix the PDDA and ethylene glycol evenly. Then 650μL of 0.1 M AgNO3 solution were added to the flask. First use the oscillator to oscillate 1min, then ultrasonic 1 min to make the solution evenly. Place the solution in a 195℃ degree-oil bath and react with intense agitation. All glassware used in the experiments was cleaned in a bath of freshly prepared aqua regia (HCl : HNO3 = 3 : 1) and rinsed thoroughly in deionized water and ethanol. When the reaction is stopped, the flask is placed in an ice bath and quenched. The resulting product was first centrifuged at 10000 r / min for 15 min to remove the supernatant and the products were washed twice with ethanol and water, respectively.

Characterization of the prepared AgCl crystals

The prepared AgCl crystals were characterized by optical microscopy, XRD and SEM. The phases of samples were characterized by X-ray diffraction (XRD, Cu Kα1 radiation, Rigaku /Ultima IV, Japan). The morphologies and structures of samples were studied using scanning electron microscopy (SEM, 3.0kV, SU70, Hitachi, Japan).

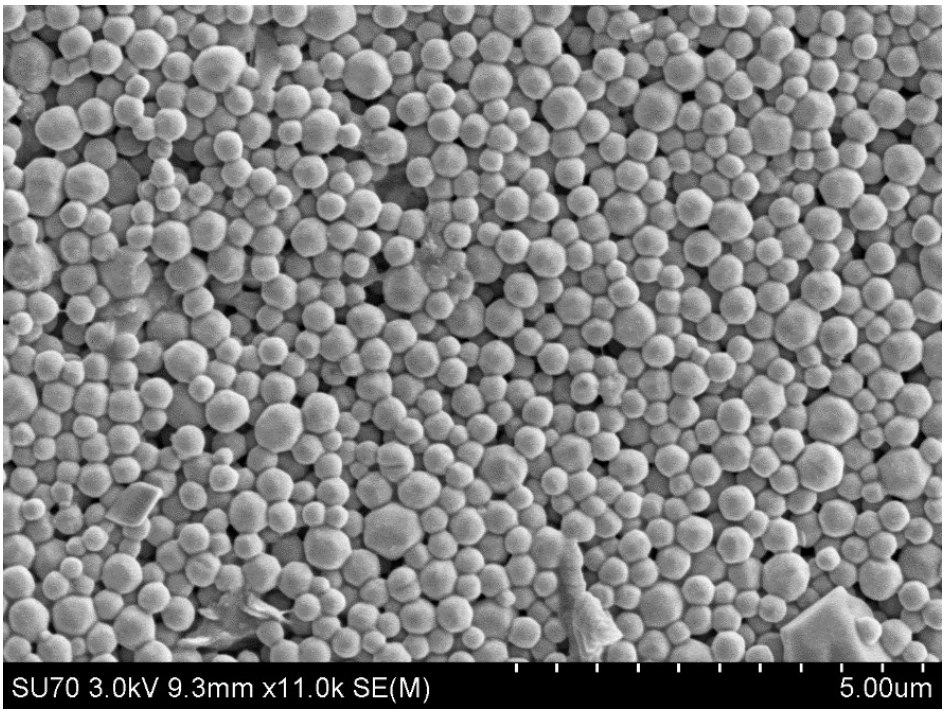

Fig. S1 SEM micrograph of AgCl crystals prepared at a reaction temperature of 170 ° C.

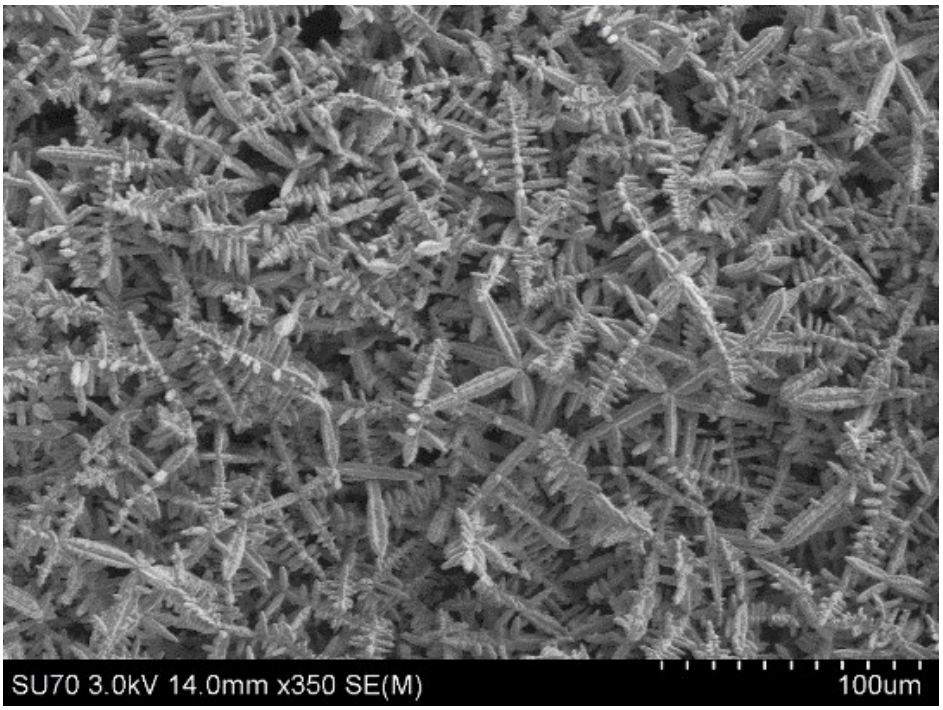

Fig. S2 SEM micrograph of AgCl crystals prepared at a reaction temperature of 190 ° C.

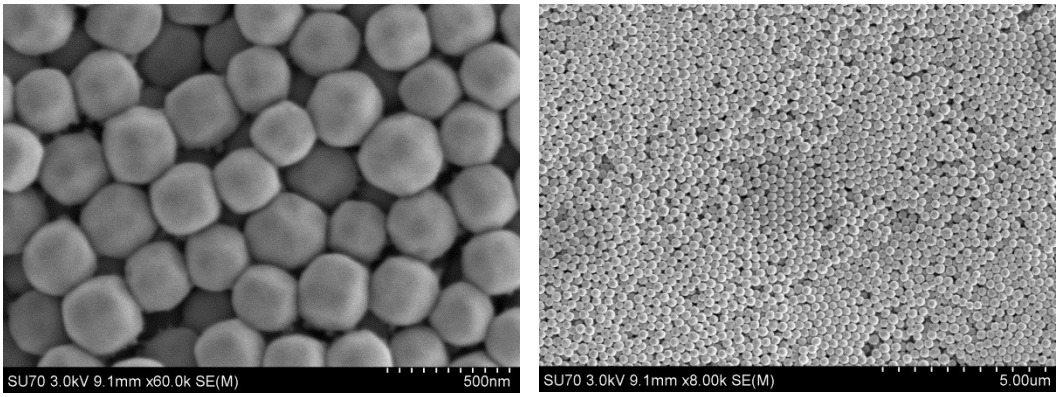

Fig.S3 SEM image of AgCl microcrystals with 15 mg NaCl. Left: High magnification; Right: Low magnification

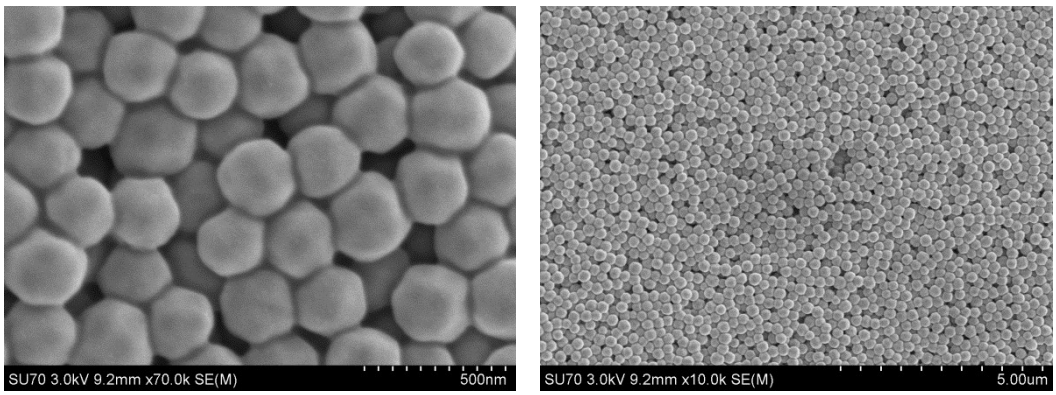

Fig.S4 SEM images of AgCl microcrystals with 30 mg NaCl. Left: High magnification; Right: Low magnification

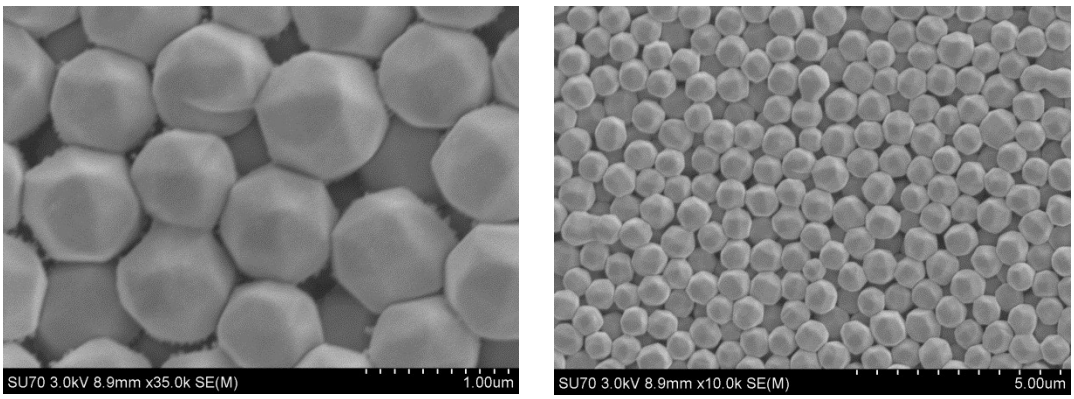

Fig.S5 SEM images of AgCl microcrystals 90 mg NaCl. Left: High magnification; Right: Low magnification

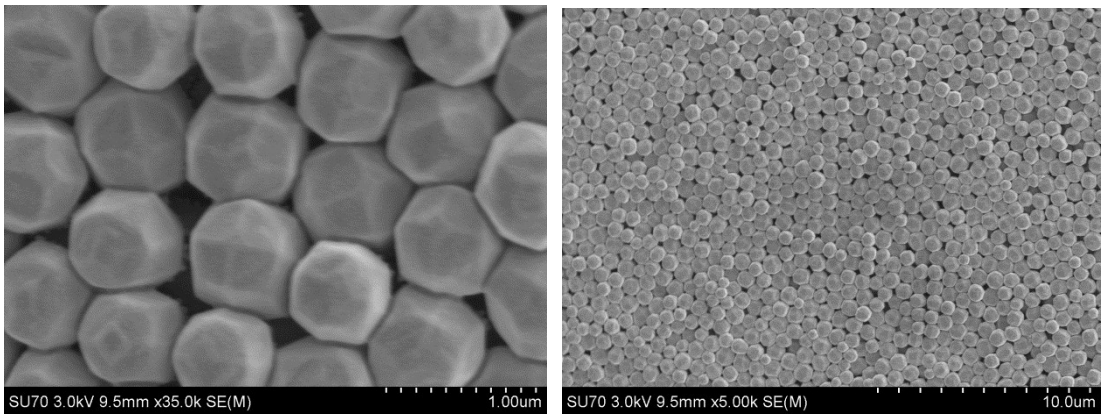

Fig.S6 SEM images of AgCl microcrystals 120 mg NaCl. Left: High magnification; Right: Low magnification

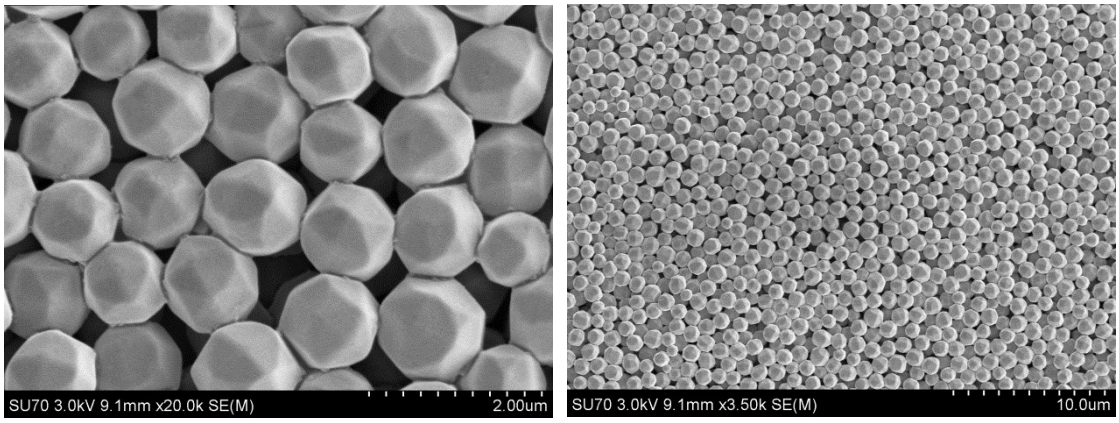

Fig.S7 SEM images of AgCl microcrystals 150 mg NaCl. Left: High magnification; Right: Low magnification

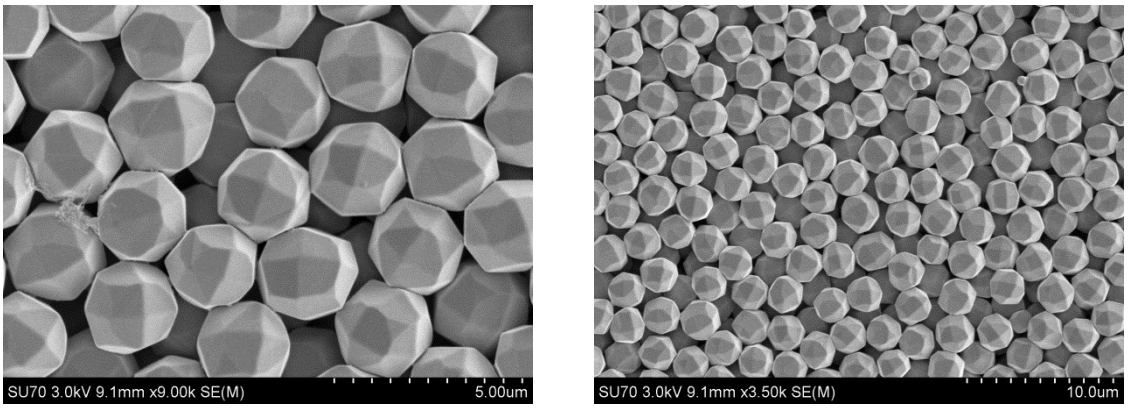

Fig.S8 SEM images of AgCl microcrystals 165 mg NaCl. Left: High magnification; Right: Low magnification

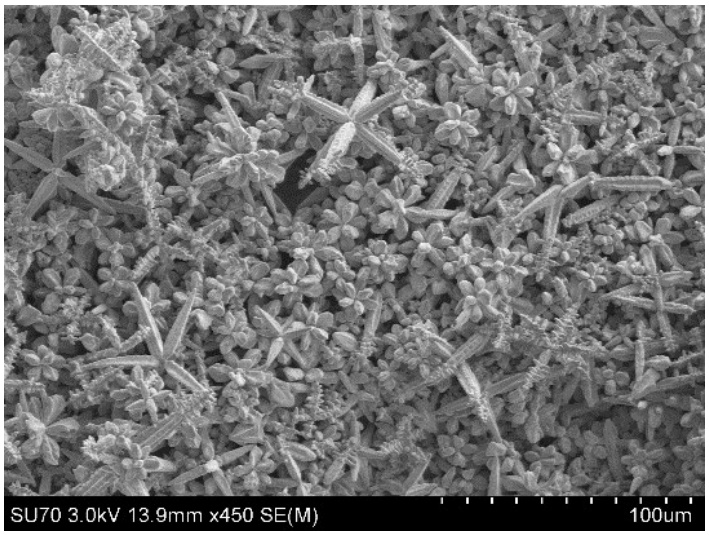

Fig. S9 SEM image of AgCl crystals when the amount of NaCl is 200 mg.

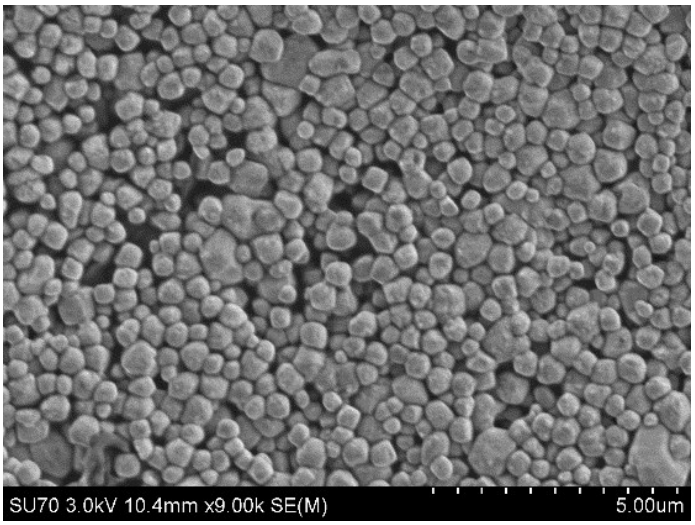

Fig. S10 SEM image of AgCl crystals when the amount of NaCl is 700 mg.

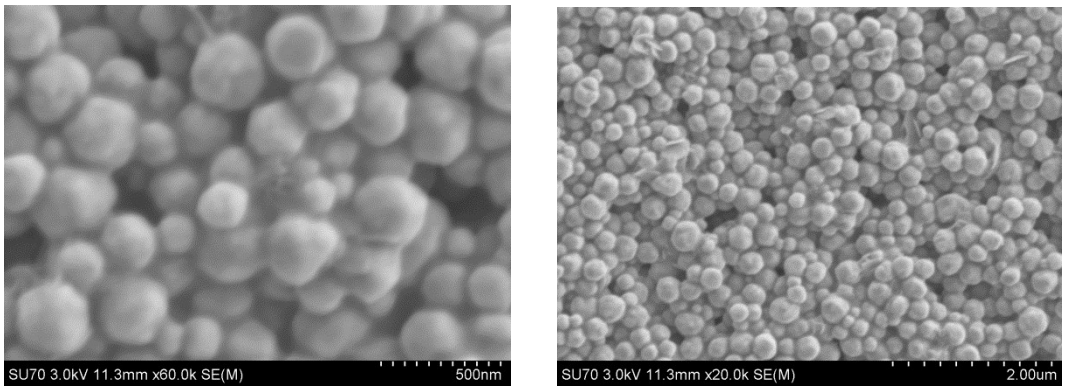

Fig.S11 SEM images of AgCl crystals obtained without heating.

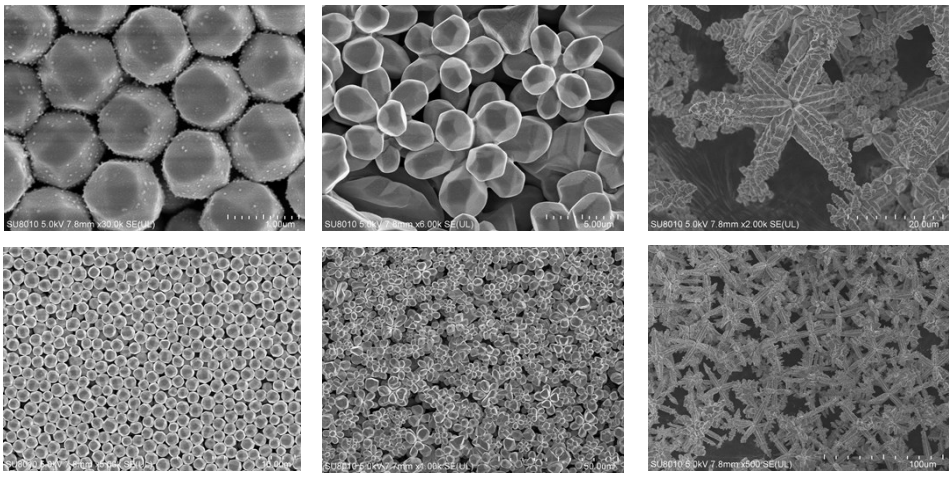

Figure S12 KCl was used as the source of Cl- ions to prepare the SEM image of AgCl crystals. The amounts of KCl were 320 mg, 380 mg and 440 mg, respectively.

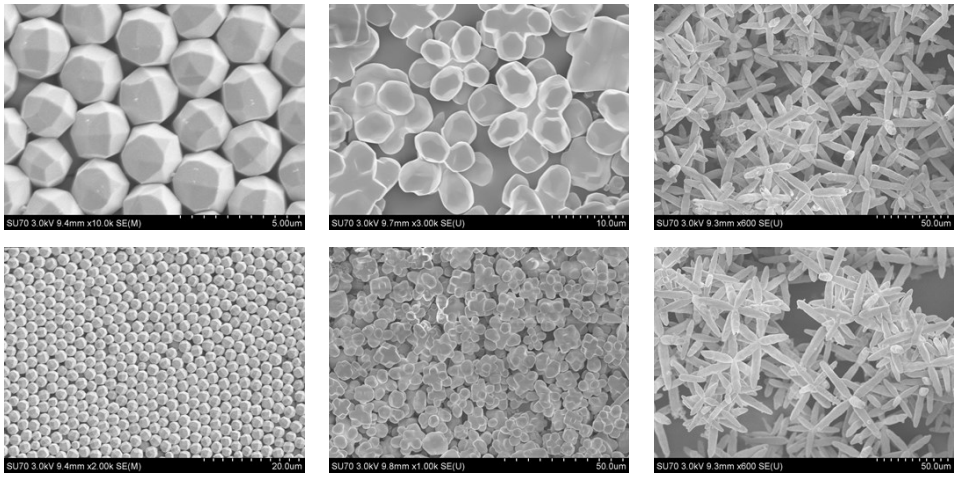

Figure S13 MgCl2 as the source of Cl- ions, the SEM image of AgCl crystals prepared, the amounts of MgCl2 are 480mg, 660mg and 800mg, respectively.

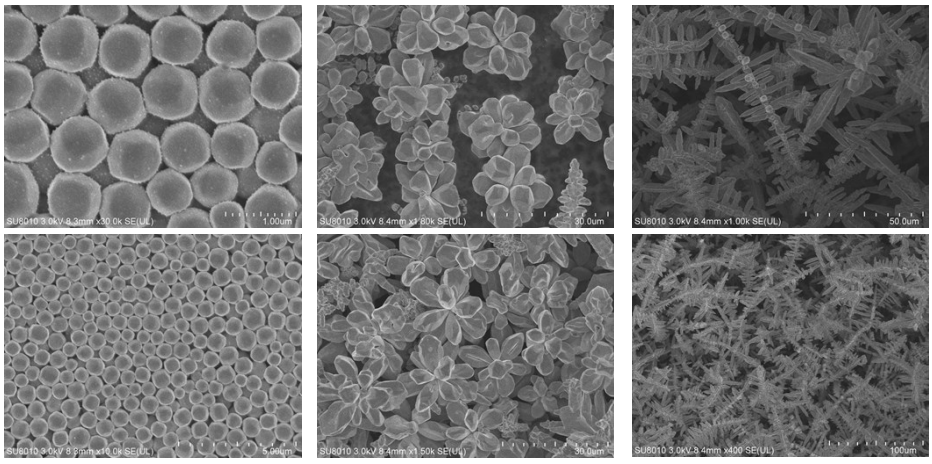

Figure S14 CaCl2 was used as the source of Cl- ions to prepare SEM images of AgCl crystals. The amounts of CaCl2 were 375 mg, 525 mg and 575 mg, respectively.