Electronic supplementary information (ESI)

Shape-controlled synthesis of micro/nanosized copper particles with spherical and polyhedral shapes by the polyol process

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Abstract. In our present study, the synthesis of Cu micro/nanosized particles by the polyol process. Cu micro/nanosized particles are synthesized by reducing copper (II) chloride in ethylene glycol (EG), polyvinylpyrrolidone (PVP), and potassium bromide (KBr) at low temperature with or without the use of sodium borohydride.

Keywords. the polyol process; the polyol technology; Cu; CuO; plasmon band

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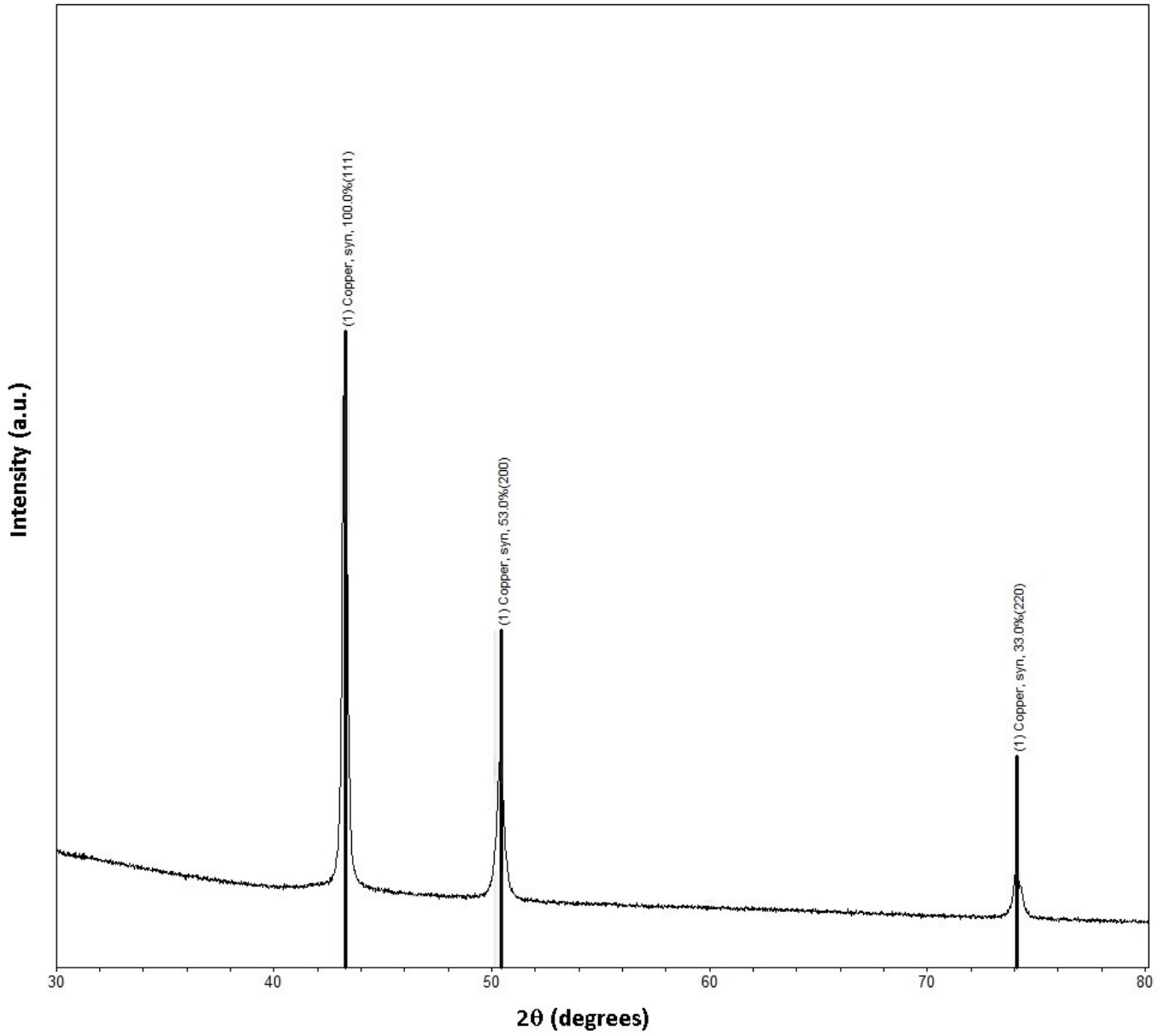

Fig. 1. (c) Nanosized Cu particles less than 100 nm by XRD (Rigaku D/max 2550V) (Sample 1).

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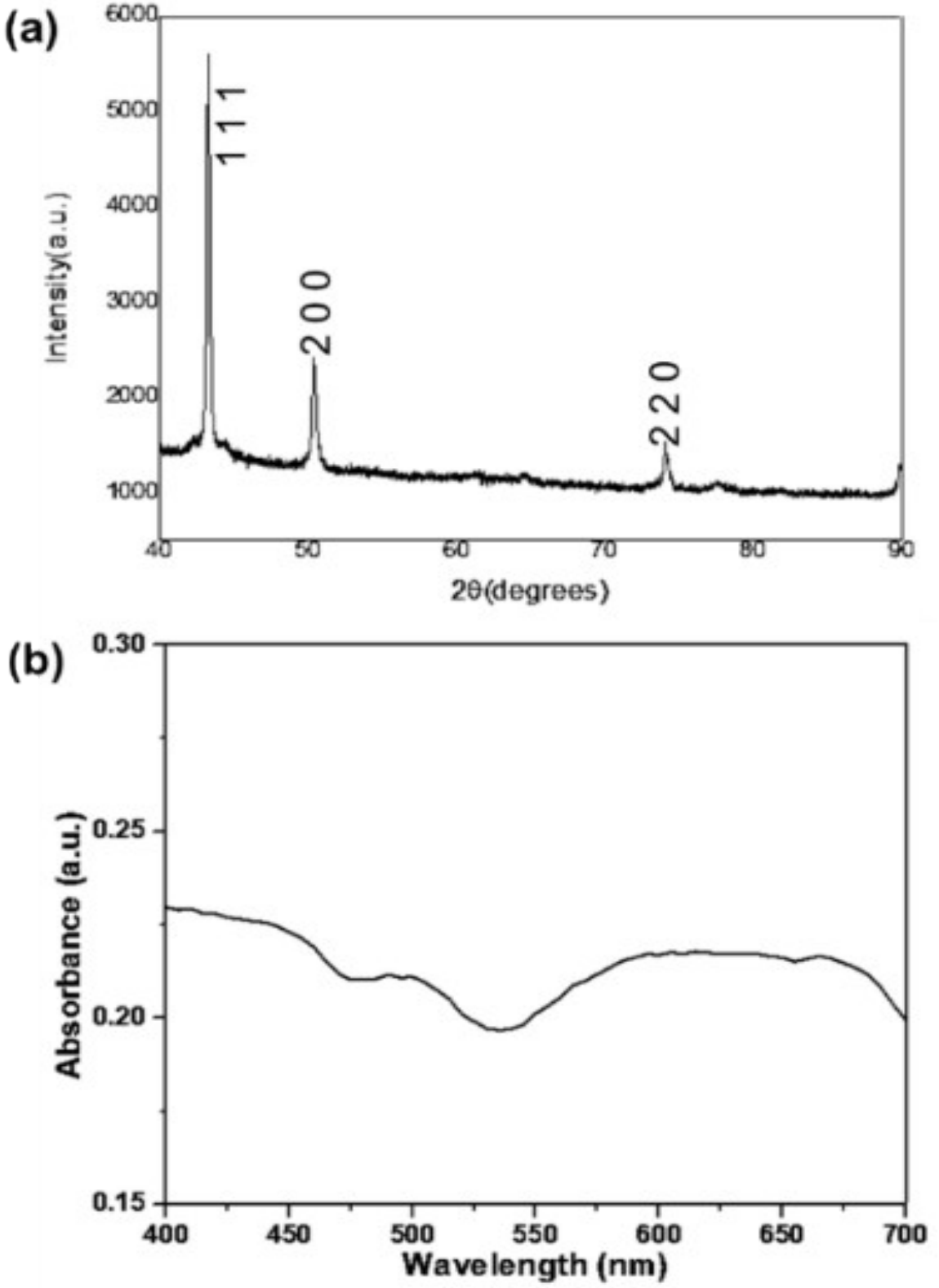

Fig. 2. (a) Micro/nanosized Cu particles (Sample 2) by XRD (Panalytical X'PERT PRO, The Netherlands), and (b) UV-vis measurements (EMC-NANO-UV Spectrophotometer).

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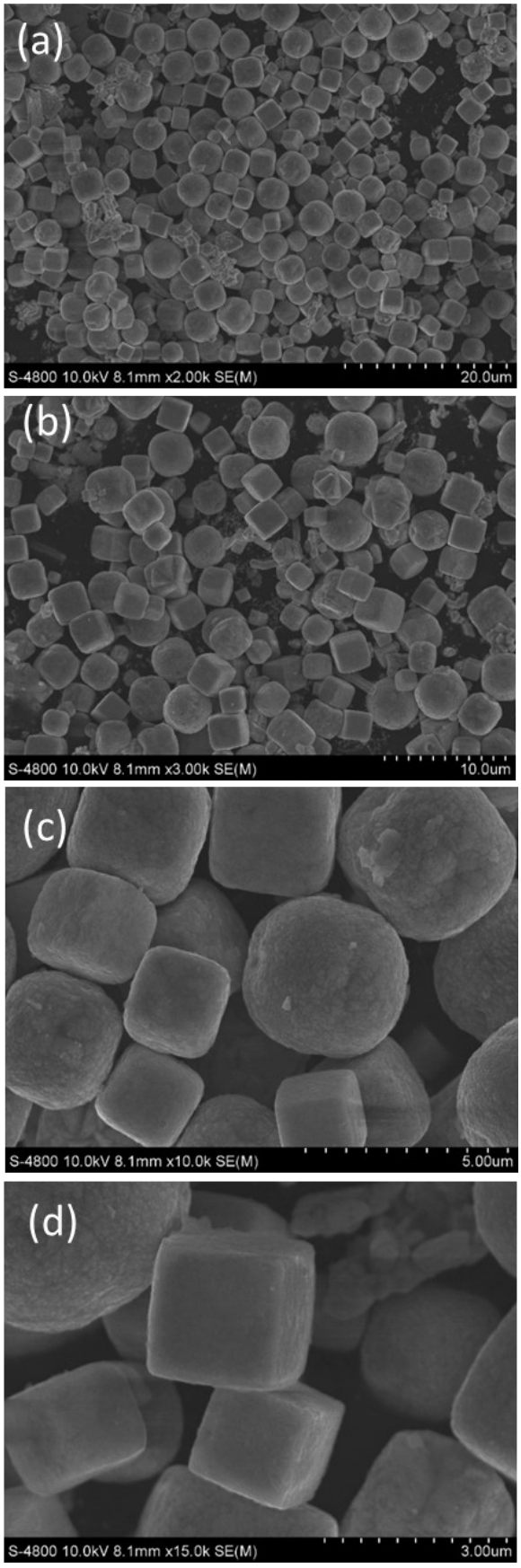

Fig. 3. Micro/nanosized Cu particles by SEM (S-4800). Scale bars: (a) 20 μm (Sample 2). (b) 10 μm (Sample 3). (c) 5 μm, and (d) 3 μm (Sample 2). The size and shape are appropriately evaluated.

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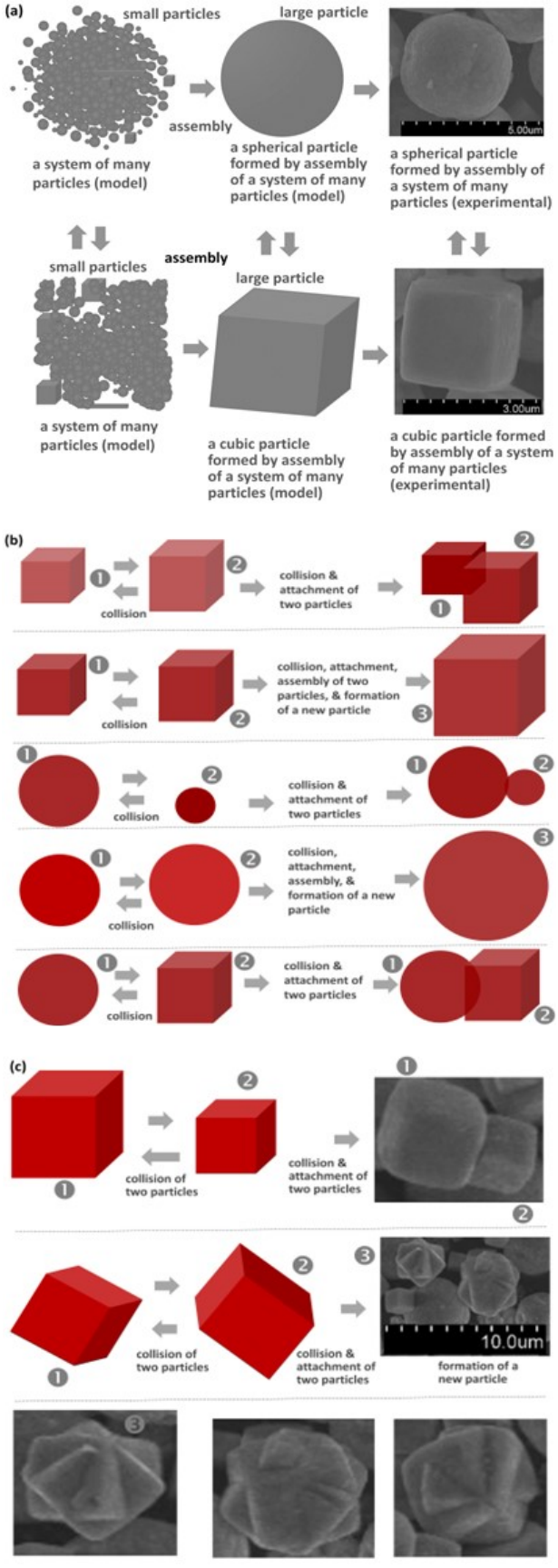

Fig. 4. Models: (a) Formation of various spherical and cubic particles by assembly. (b) Attachment. (c) Collision, attachment, and formation of two cubic particles of a new large particle according to experimental evidences in colloidal synthesis. (1) and (2) label the as-prepared particles with cubic or spherical shape. (3) a new particle (about 3-4 μm).

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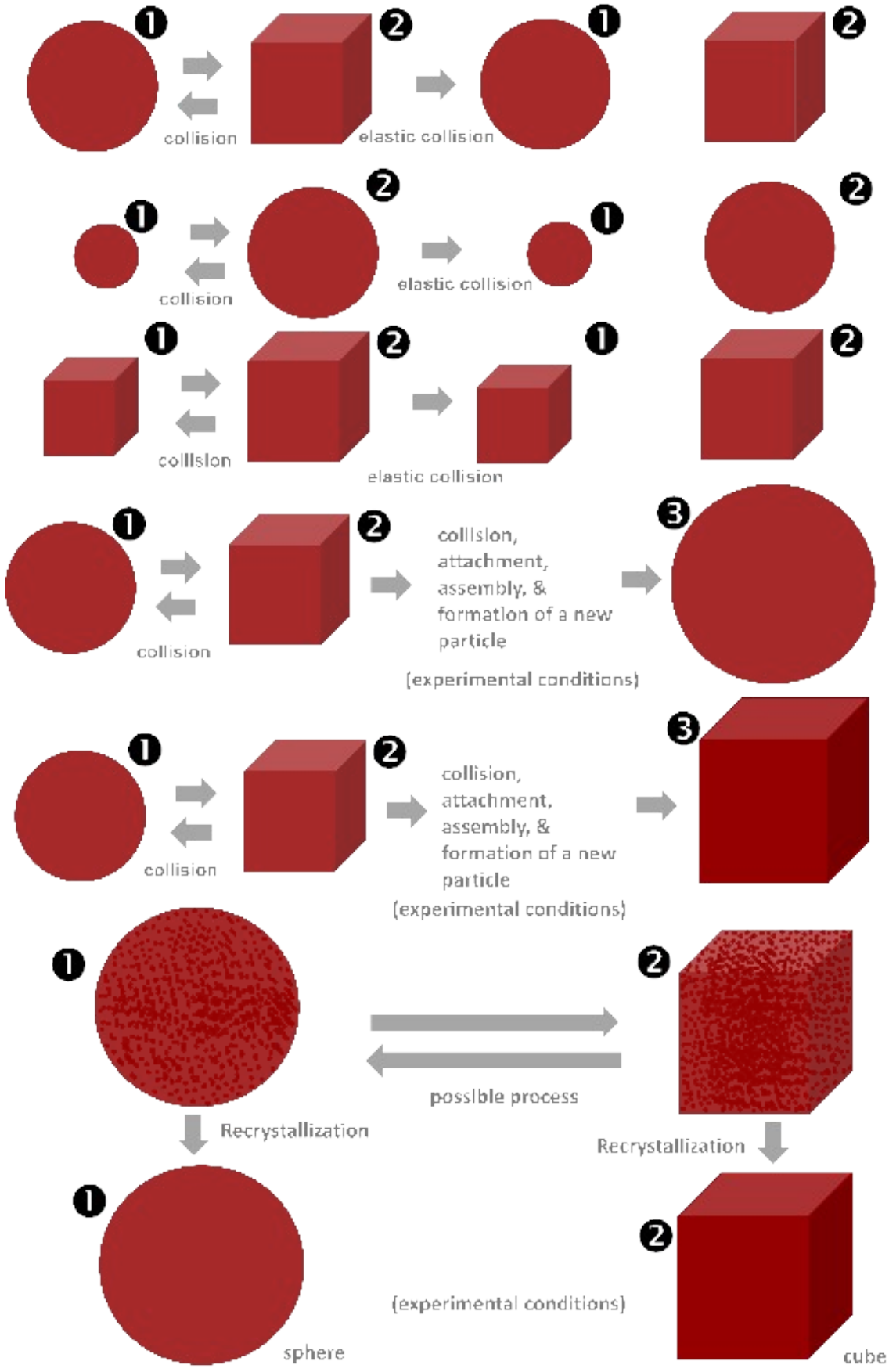

Fig. 5. Model of formation of large spherical and cubic particles by assembly. Label: (1) spherical particle; (2) cubic particle; (3) a formation of a new particle with spherical or cubic shape.