Electronic Supplementary Material (ESI) for RSC Advances

Supporting Information

Fabrication of microparticles with controllable internal woodpile structures for highly efficient sensing applications†

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1. Tuning the photonic band-gap (PBG) by varying the laser exposure time resulting in change of filling fraction

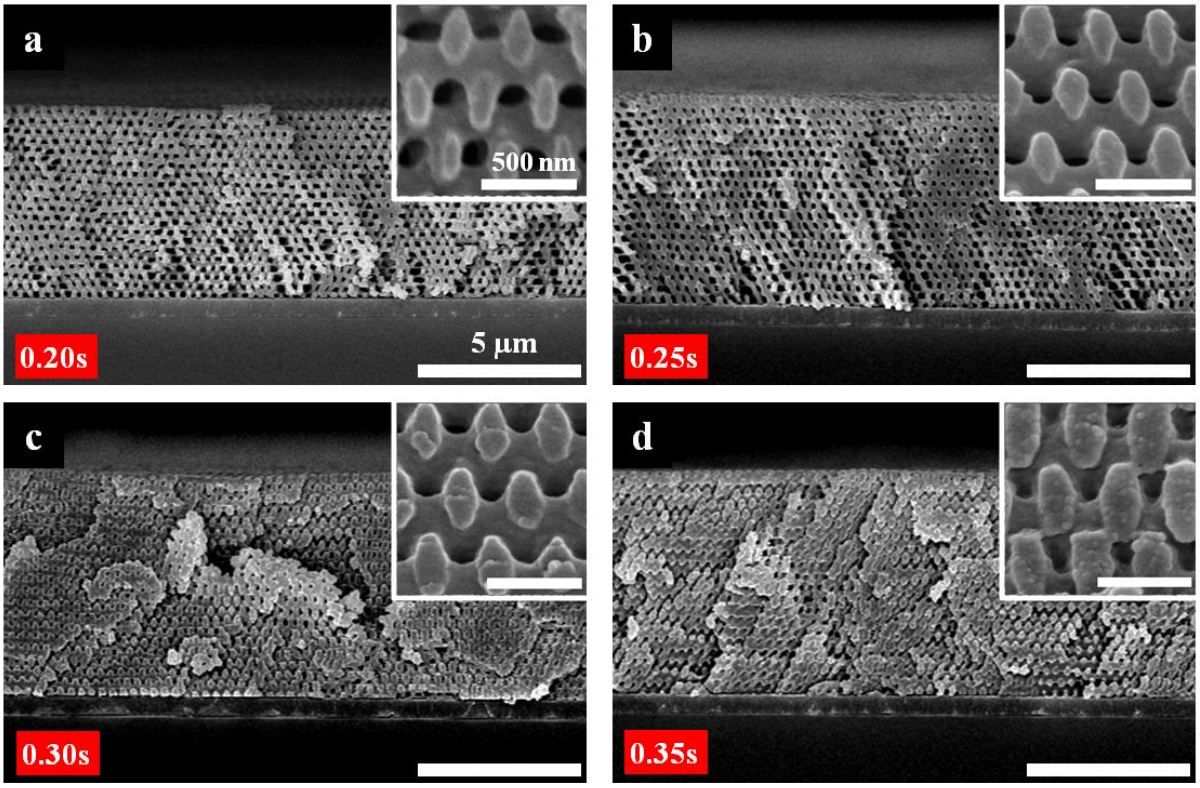

Fig. S1 Cross-sectional view SEM images of resulting woodpile structures with various laser exposure times at a) 0.2 s, b) 0.25 s, c) 0.3 s, and d) 0.35 s. Insets in (a-d) show magnified SEM images of each cross-sectional woodpile structures.

2. Change of woodpile structures after SF_6 reactive ion etching process

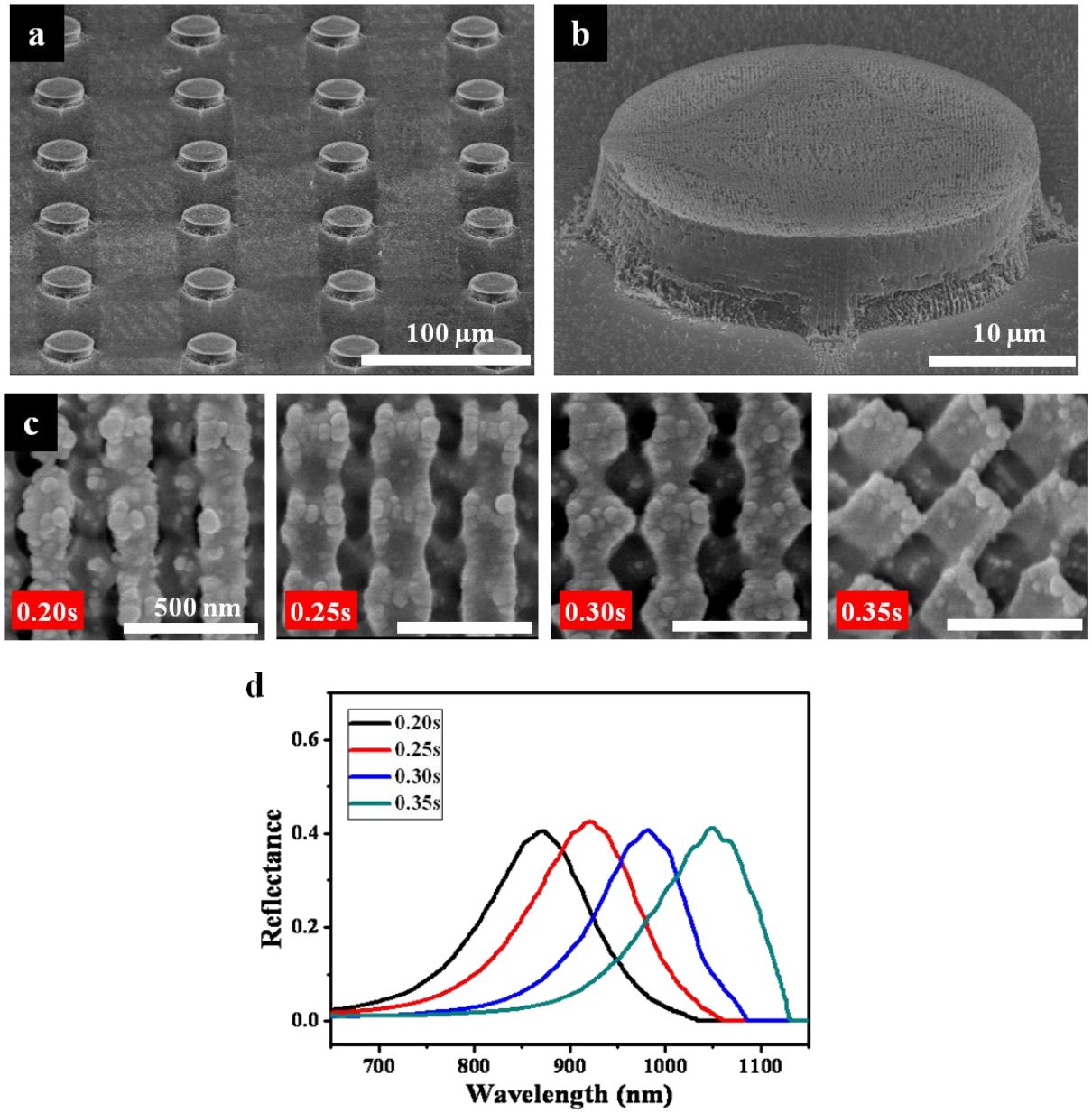

Fig. S2 SEM images of a) microarrays with internal woodpile structure after SF_6 RIE and b) a single microstructure represented in a). c) SEM images showing the surfaces of microparticles with internal woodpile structure at different laser exposure time from 0.2 s to 0.35 s after SF_6 RIE process. d) Reflectance spectra of the woodpile structures obtained by various laser exposure times after SF_6 RIE.

3. Variation of surface morphology of silver-decorated microparticles for silver deposition time

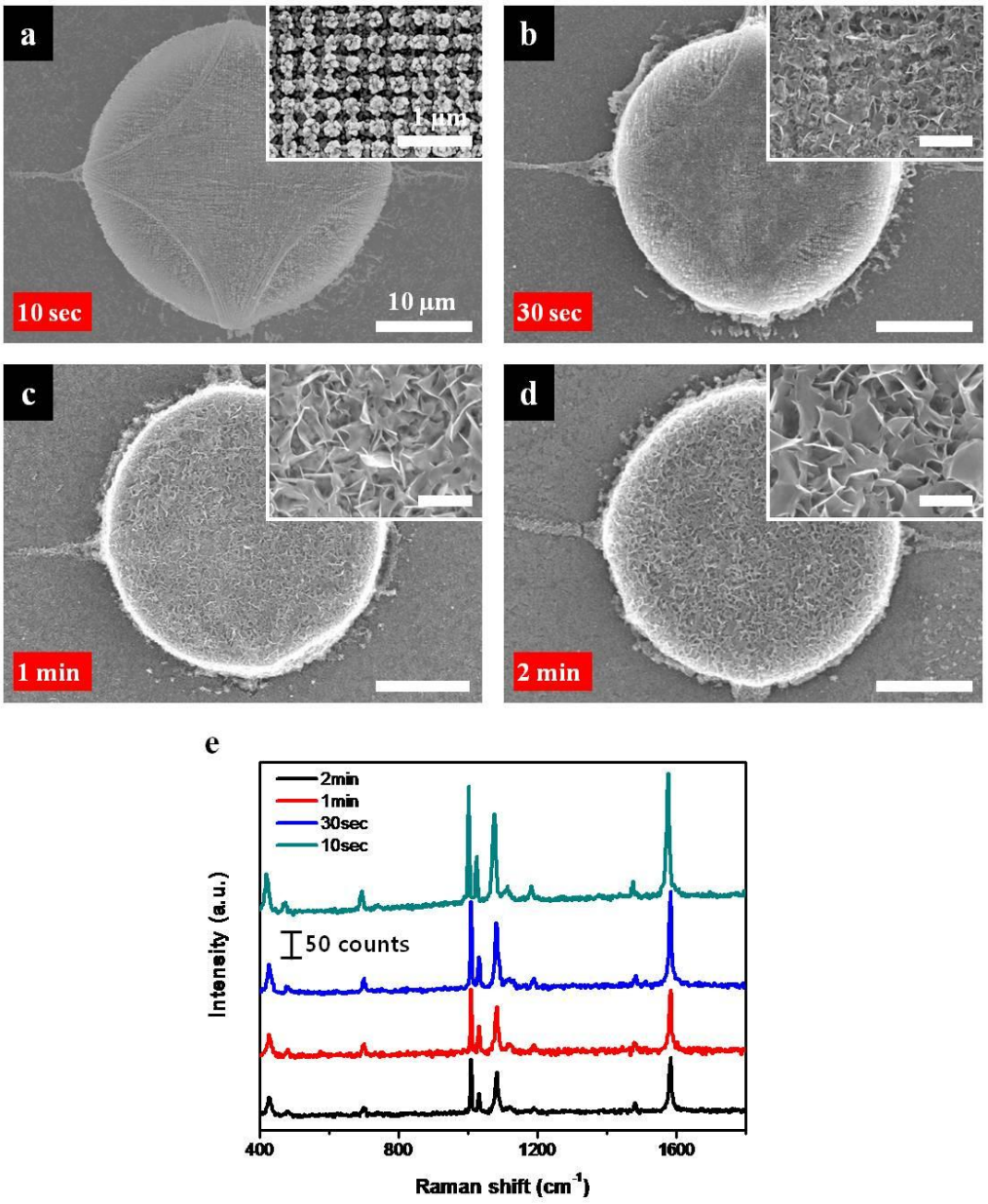

Fig. S3 (a-d) SEM images displaying variation of surface morphology of silver-decorated microparticles with internal woodpile structure according to the silver deposition times from 10 sec to 2 min. Insets show magnified top view SEM images of each particles. e) SERS spectra of BT-adsorbed silver-decorated microparticles with internal woodpile structure for silver deposition times. The integration time was 5 s.

4. Potential for Real-time molecular detection in the microfluidic chips

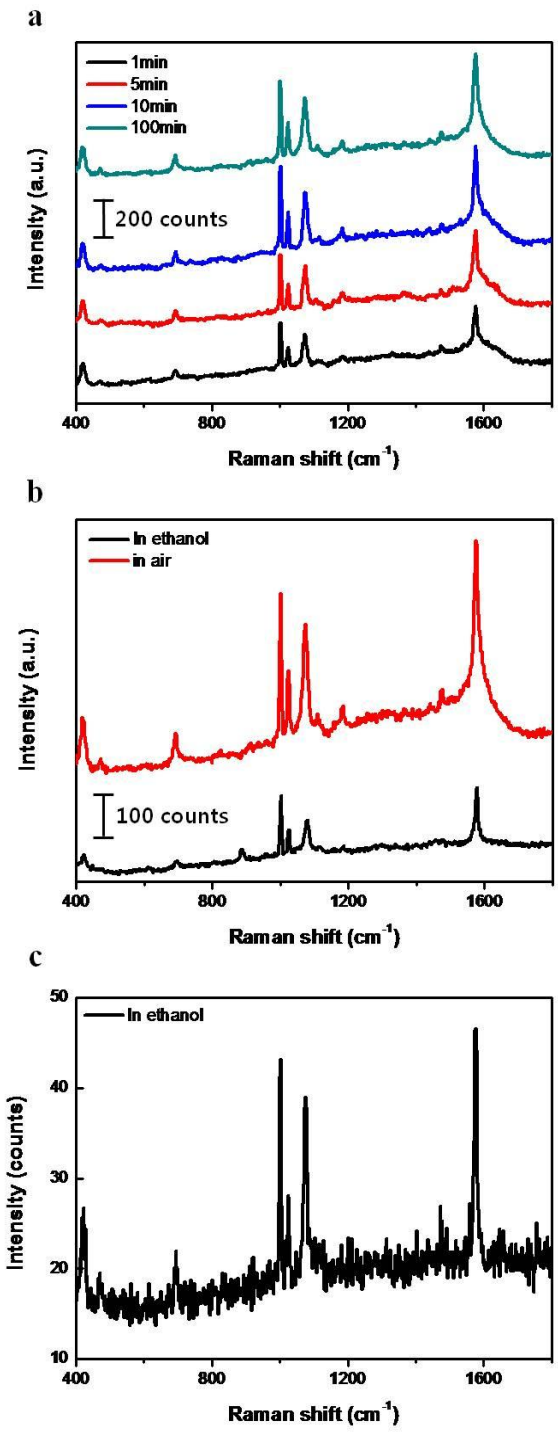

Fig. S4 SERS spectra of BT-adsorbed silver-decorated microparticles with internal woodpile structure a) according to immersion time of microparticles in 2 mM BT solution and (b, c) measured from microparticles in air and ethanol. The integration times of (a,b) and c) were 5 s and 1 s, respectively.