



2019「中技社科技獎學金」

2019 CTCI Foundation Science and Technology Scholarship

研究獎學金

Research Scholarship



膜上溶劑退火：異向性高分子粒子的製備與形貌轉變探討

Solvent On-Film Annealing (SOFA):

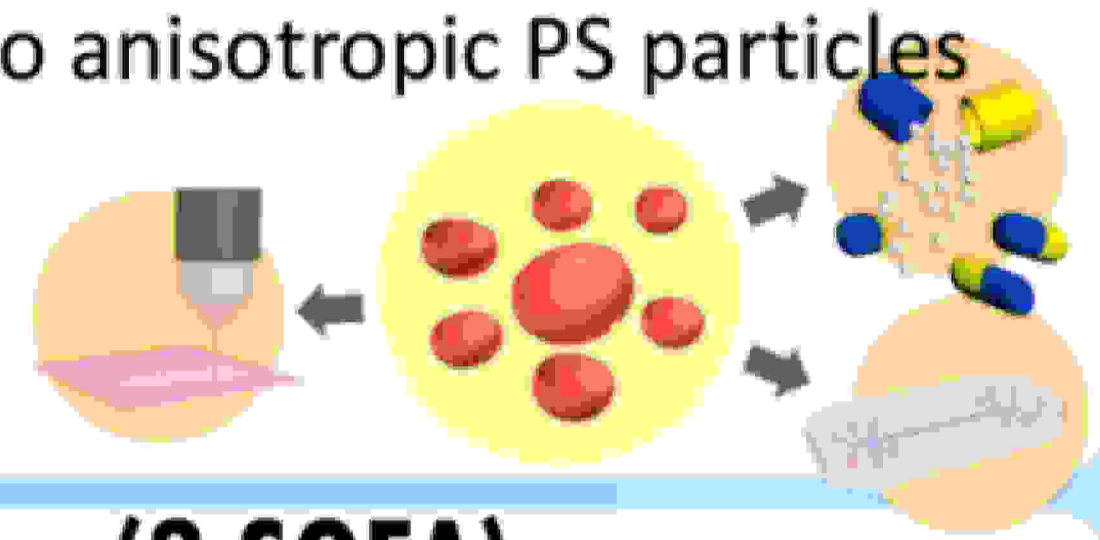
Fabrication and Morphology Evolution of Anisotropic Polymer Particles

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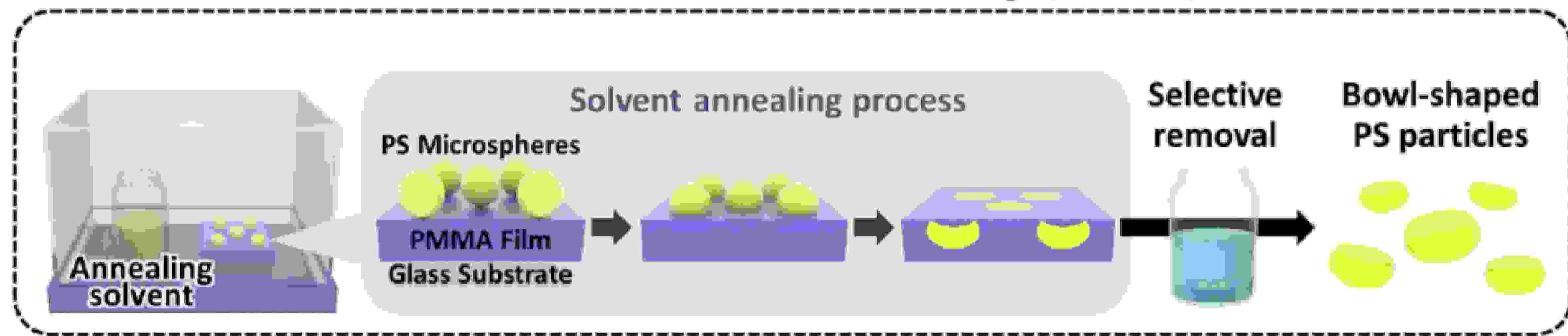
研究重點

Here, we develop a versatile and facile approach, the solvent on-film annealing (SOFA) method, to fabricate anisotropic polymer particles with diverse morphologies. Polystyrene (PS) microspheres on poly(methyl methacrylate) (PMMA) films are used as model materials. Using the SOFA method, the PS microspheres transform into anisotropic PS particles driven by the surface and interfacial tensions. By treating samples in different solvent vapors or in sequential annealing steps, PS particles with various shapes, such as peanut-shaped, snowman-shaped, and bowler hat-shaped particles, can be formed. The morphology evolution of the transformed PS particles is characterized by optical microscopy (OM), scanning electron microscopy (SEM), and atomic force microscopy (AFM).

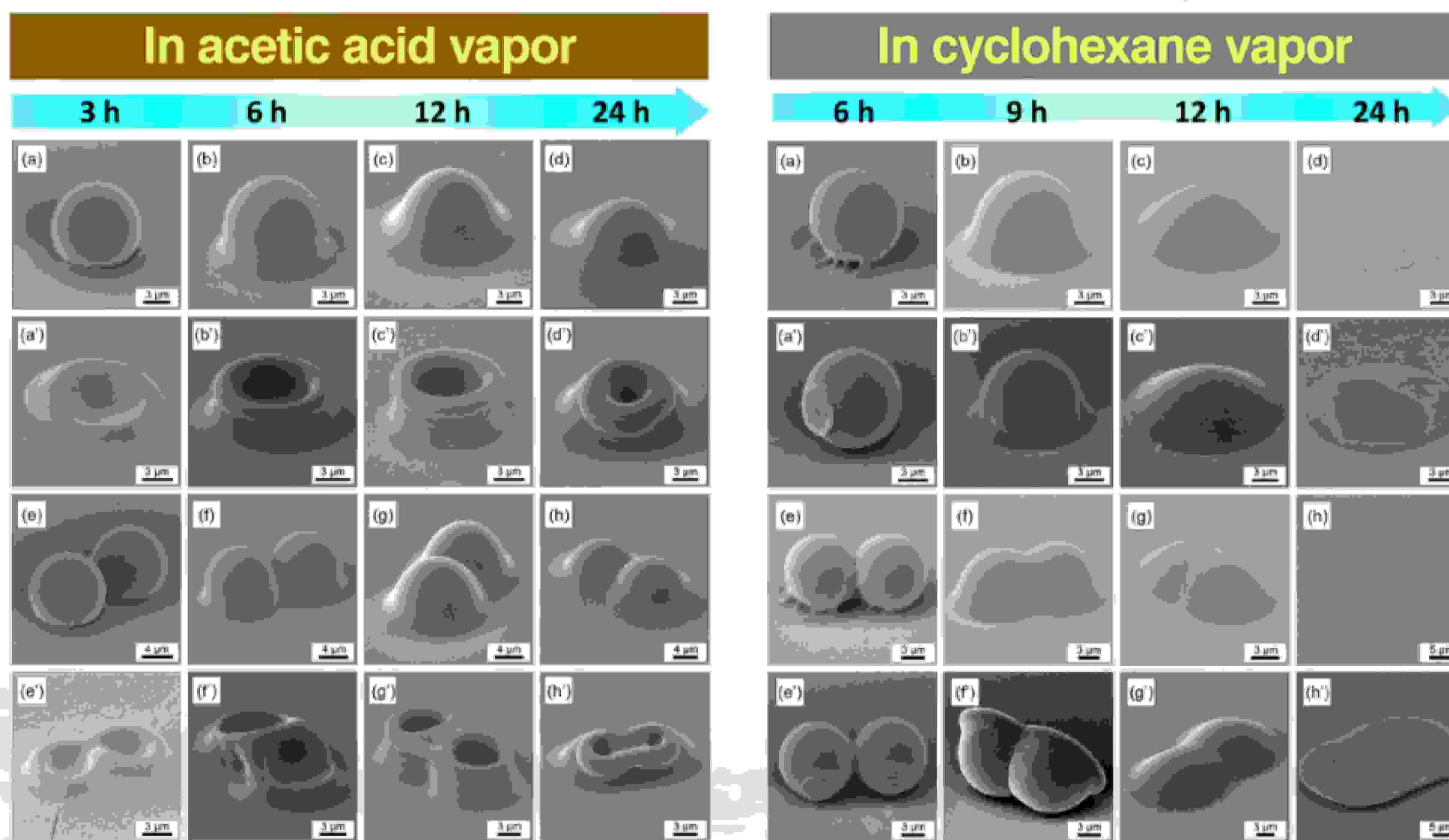


研究成果

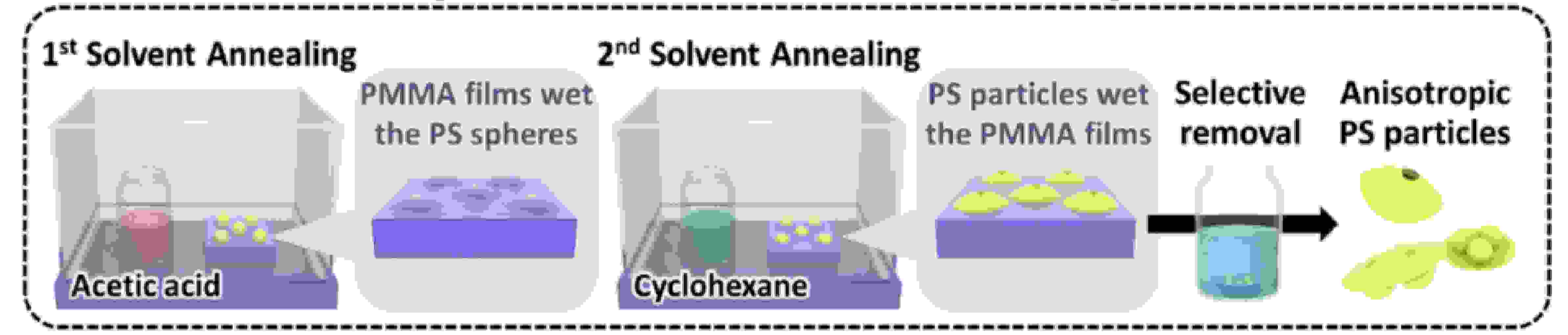
Solvent On-Film Annealing (SOFA)



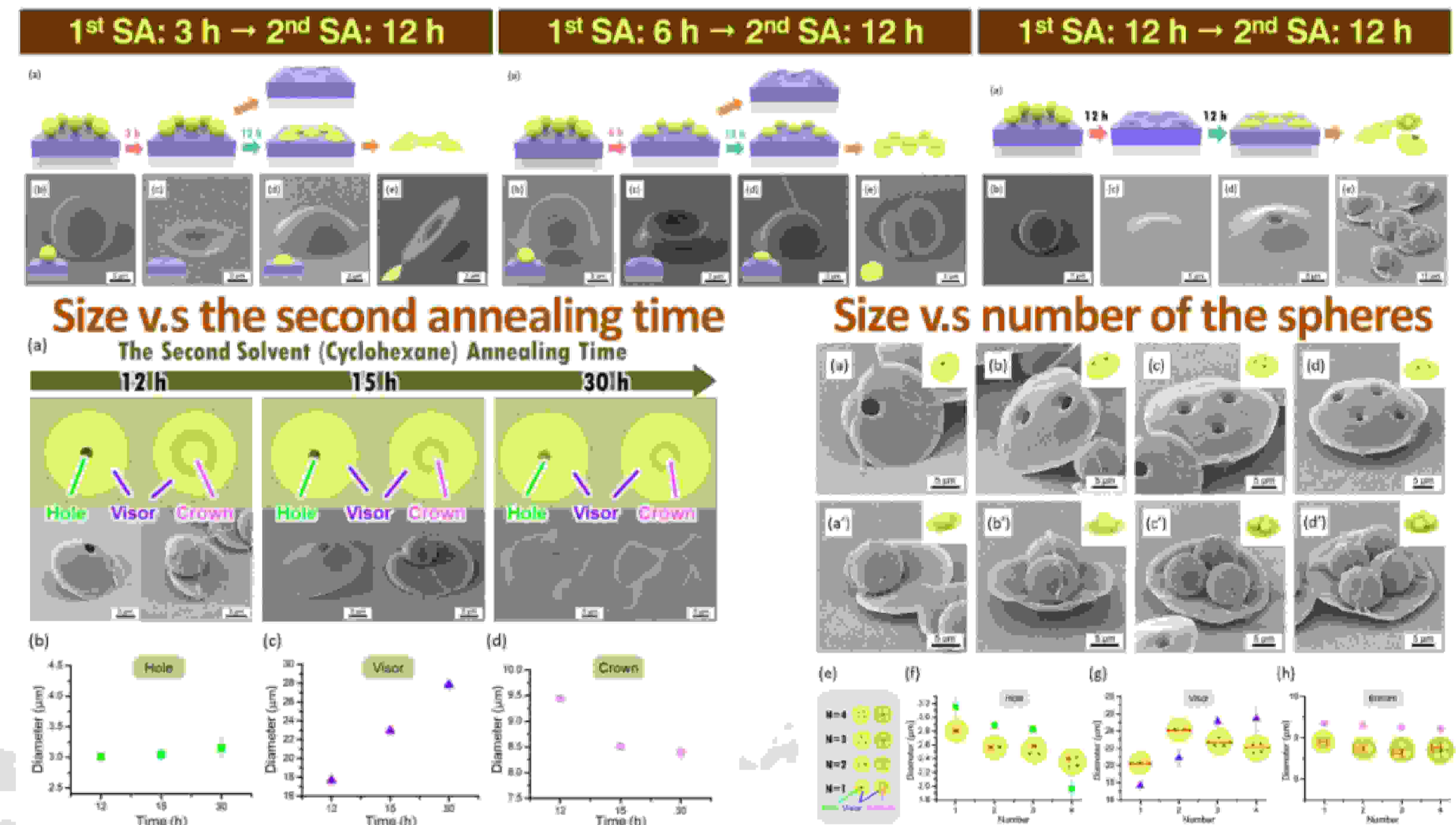
SEM images of single and double PS spheres annealed on PMMA films for different times before and after selective removal processes



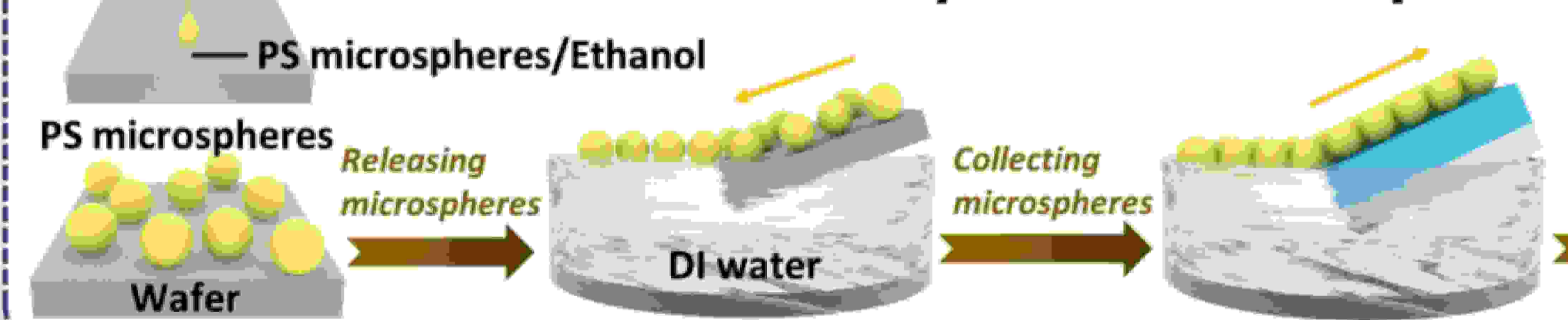
Two-step Solvent On-Film Annealing (2-SOFA)



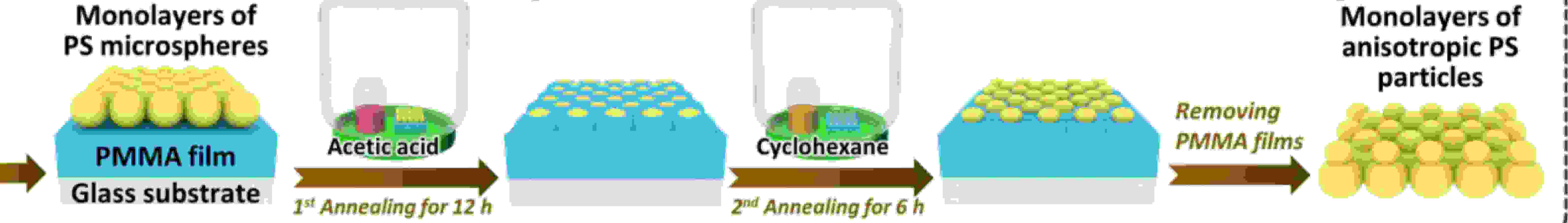
Annealed PS/PMMA composites under acetic acid vapors for different times and cyclohexane vapors for 12 h before and after selective removal processes



Fabrication of Monolayers of PS Microspheres



Sequential Selective Solvent On-Film Annealing

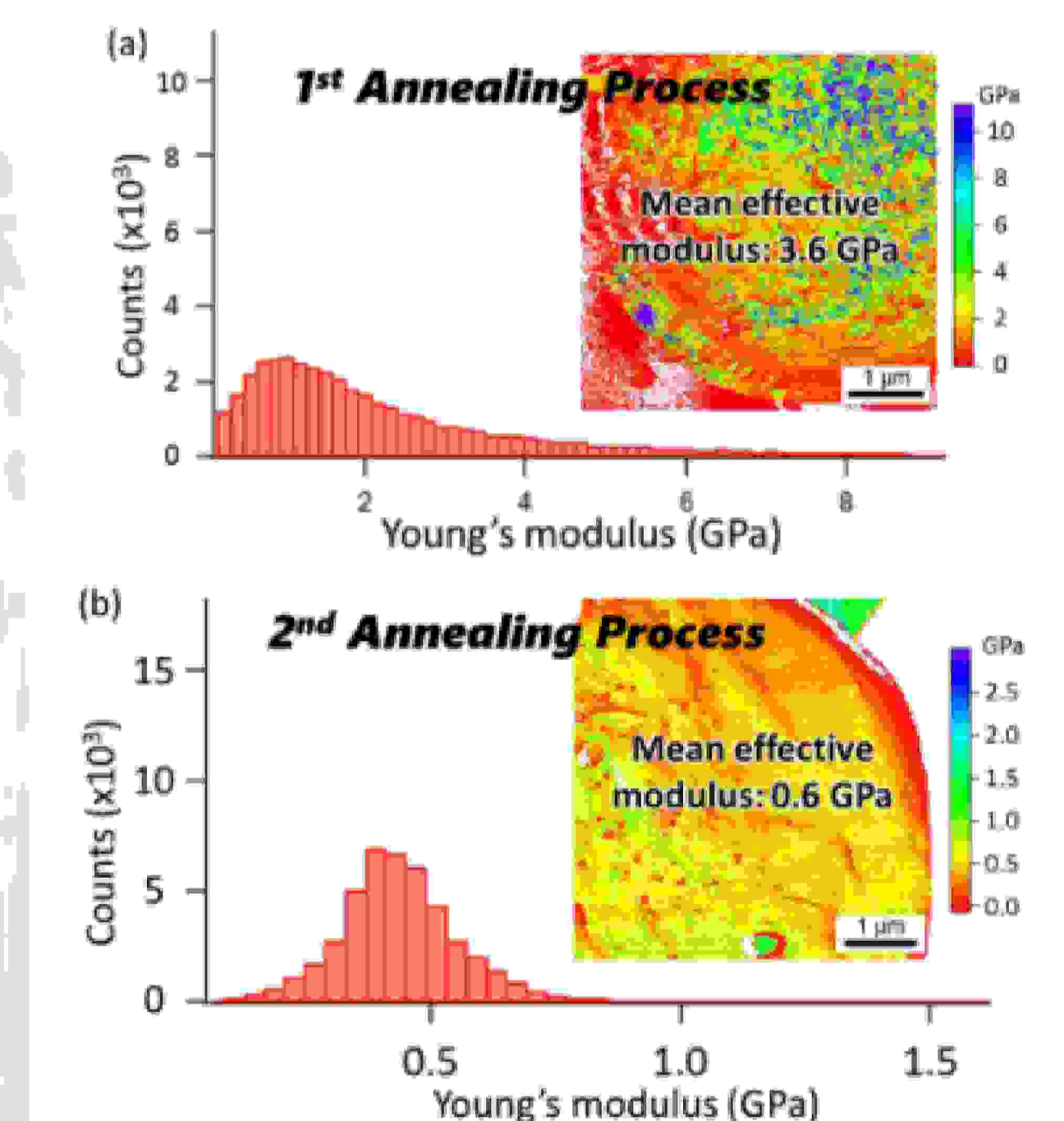
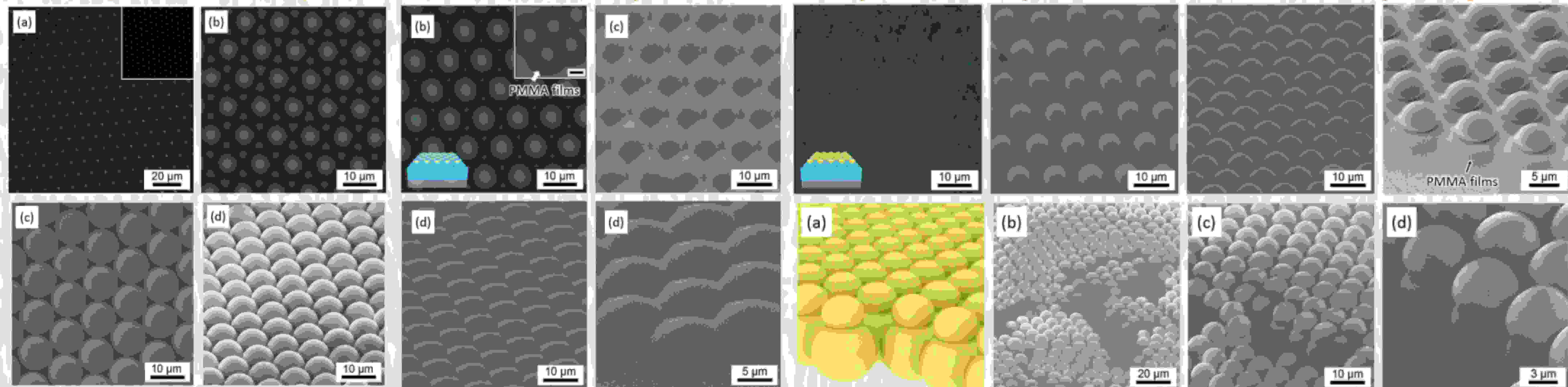


OM and SEM images of monolayers of PS microspheres

Annealed PS/PMMA composites under acetic acid vapors for 12 h

Annealed polymer composites under acetic acid vapors for 12 h and cyclohexane vapors for 6 h, and snowman-shaped PS particles

Young's modulus maps and histograms of the PS particles



研究生活及心得

回首碩博班這些年的研究之路，雖然實驗失敗是家常便飯，但快樂遠大於苦悶。非常感謝碩博班指導教授陳俊太老師，因為他的鼓勵與正向積極的態度，讓我在研究與人生道路上一路充滿熱情與自信，同時也謝謝實驗室夥伴平日的陪伴帶來許多歡樂。另外感謝我的父母，始終支持並相信我的決定，給我很多溫暖和信心，讓我可以無所畏懼的攻讀博士班。最後也謝謝中技社提供這麼棒的機會，給我們一個舞台可以互相分享研究喜悅！



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