Supporting Information


Light-Induced Surface Modification of Natural Plant Microparticles: Toward Colloidal Science and Cellular Adhesion Applications

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Figure S1. Pictorial diagram of defatting of *Camellia sinensis* bee pollen: (a) Pre-defat, sonication, and mesh filtration, (a.i.) *C. sinensis* bee pollen granules, (a.ii.) defat in acetone, (a.iii.) vacuum filtration, (a.iv.) bath-sonication of pollen in water, (a.v.) nylon mesh filtration to remove large contaminants; (b) Vacuum filtration and washing, (b.i.) vacuum filtration, (b.ii.) transfer pollen mass to beaker for washing, (b.iii.) rinsing of vacuum filter, (b.iv.) pollen washing, (b.v.) transfer to round-bottom flasks with acetone; and (c) Defatting and drying, (c.i.) defat separately in acetone and diethyl ether, (c.ii.) vacuum filtration, (c.iii.) partial drying during vacuum filtration, (c.iv.) disperse pollen clumps in drying dishes, (c.v.) prepare for drying.
Figure S2. Images of bee-collected *Camellia sinensis* pollen defatting process: (a) Stereo optical microscope images and scanning electron microscope images of natural bee-collected pollen granules; and (b) Stereo optical microscope images of defatted pollen particles.
Figure S3. Micromeritic properties of defatted pollen particles: particle distributions of diameter, circularity, and aspect ratio, and representative optical microscope images of discrete pollen particles.
Figure S4. Scanning electron microscope (SEM) images of particle distributions, single particles, and particle surface morphology for untreated (0 min) pollen and ultraviolet-ozone (UV-O) treated (15, 30, 60, 120 min) pollen particles.
Figure S5. Wide scan XP-spectra of untreated (0 min) and ultraviolet-ozone (UV-O) treated (15, 30, 60, 120 min) pollen particles.
**Figure S6.** Peak fitting of narrow scan XPS data for chemical binding distributions of carbon (C1s) and oxygen (O1s) peaks for untreated (0 min) and ultraviolet-ozone (UV-O) treated (120 min) pollen particles.
Figure S7. ATR-FTIR analysis for untreated (0 min) and ultraviolet-ozone (UV-O) treated (15, 30, 60, 120 min) pollen particles: (a) Sets of six ATR-FTIR spectra for each of untreated and UV-O treated pollen particles, highlighting key peaks of interest; (b) Peak-height ratio shifts of untreated and UV-O treated pollen for major peaks of interest.
Figure S8. Histogram data of particle cluster diameter for untreated (0 min) and ultraviolet-ozone (UV-O) treated (120 min) pollen particles: (a) Full set of histogram data; and (b) Reduced normalized frequency range to highlight trends for 90-150 μm and 150+ μm particle cluster diameter ranges.
Figure S9. Optical microscope images of representative particle clusters for each particle cluster size distribution range of 30-50, 50-90, 90-150, and 150+ μm, with particle cluster examples in increasing cluster size for each size distribution range.
Figure S10. Images of pollen particle stabilized Pickering emulsions with untreated (0 min) and ultraviolet-ozone (UV-O) treated (15, 120 min) pollen particles.
Figure S11. Optical microscope images of pollen particle stabilized Pickering emulsions with untreated (0 min) and ultraviolet-ozone (UV-O) treated (15, 120 min) pollen particles: (a) Pickering emulsions at day 0 incorporating a hydrophobic dye, Nile red, indicating an oil in water emulsion system; and (b) Pickering emulsions at day 7, without hydrophobic dye.
Figure S12. Confocal laser scanning microscopy (CLSM) z-stack images of pollen particle stabilized Pickering emulsions incorporating a hydrophobic dye, Nile red, with untreated (0 min) and ultraviolet-ozone (UV-O) treated (15, 120 min) pollen particles. Scale bars: 100 µm.
Figure S13. Confocal laser scanning microscopy (CLSM) 3D z-stack images of untreated (0 min) and ultraviolet-ozone (UV-O) treated (120 min) pollen particles adhered to Huh 7.5, hepatocarcinoma cells, with additional cell-only images. Scale bars: 100 µm.
Figure S14. Confocal laser scanning microscopy (CLSM) z-stack images of untreated (0 min) and ultraviolet-ozone (UV-O) treated (120 min) pollen particles adhered to Huh 7.5, hepatocarcinoma cells. Scale bars: 100 µm.
Figure S15. Scanning electron microscopy (SEM) images of ultraviolet-ozone (UV-O) treated (120 min) pollen particles adhered to Huh 7.5, hepatocarcinoma cells: (a) Top view images of pollen/cell adhesion; (b) Side-view images of pollen/cell adhesion; and (c) Top view images of pollen/cell adhesion.