Supporting Information

Elastomeric PDMS Planoconvex Lenses Fabricated by a Confined Sessile Drop Technique

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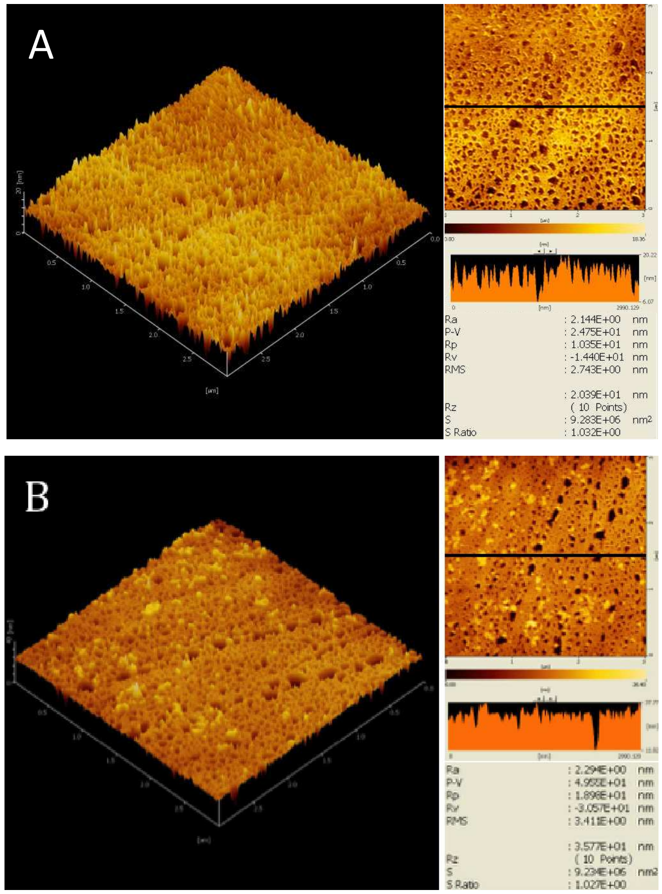

Figure S1 AFM images of a 1-mm thick PMMA disk using as a substrate for ePDMS planoconvex lens fabrication: (A) after removing the protective film and (B) after cleaning by adhesive tape for 10 times. The images were recorded with an atomic force microscope (AFM, SPA400) using micro cantilever type SI-DF20 under a tapping mode. The AFM images suggested that the surface of PMMA disk was nano-rough with Ra of ~ 2 nm. This nano-roughness makes the flat surface of ePDMS planoconvex lens adheres very well with the flat protecting window of a smartphone without any optical interference.

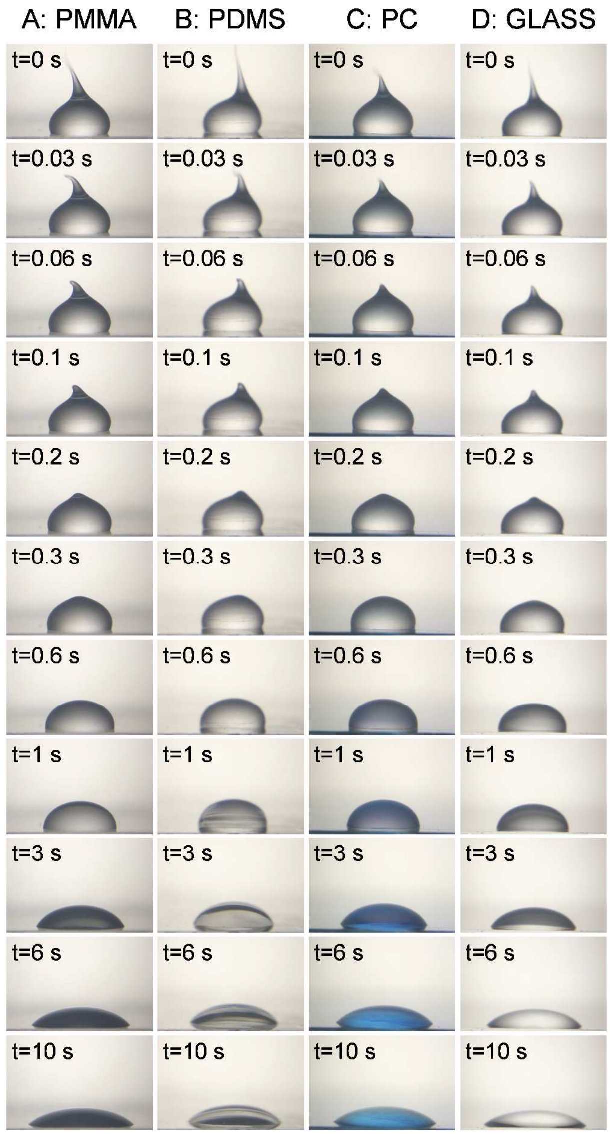

Figure S2 Time-dependent images of 15-μL lPDMS sessile drops axisymmetrically spread on selected flat surfaces. (A) poly(methyl methacrylate) (PMMA) sheet, (B) PDMS film, (C) polycarbonate (PC) sheet, and (D) glass slide.

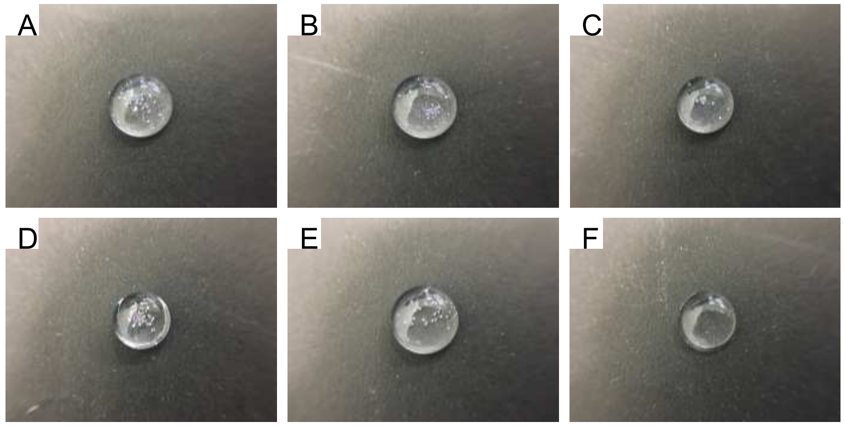

Figure S3 (A-E) PDMS elastomeric lens with air bubbles prepared by dispensing a droplet of lPDMS onto a pre-heated (150 ^{o}C) glass slide. (F) A bubble-free ePDMS planoconvex lens prepared by the confined sessile drop technique by curing a spherical cap lPDMS on 5-mm PMMA circular disk at 80 ^{o}C for 30 min.

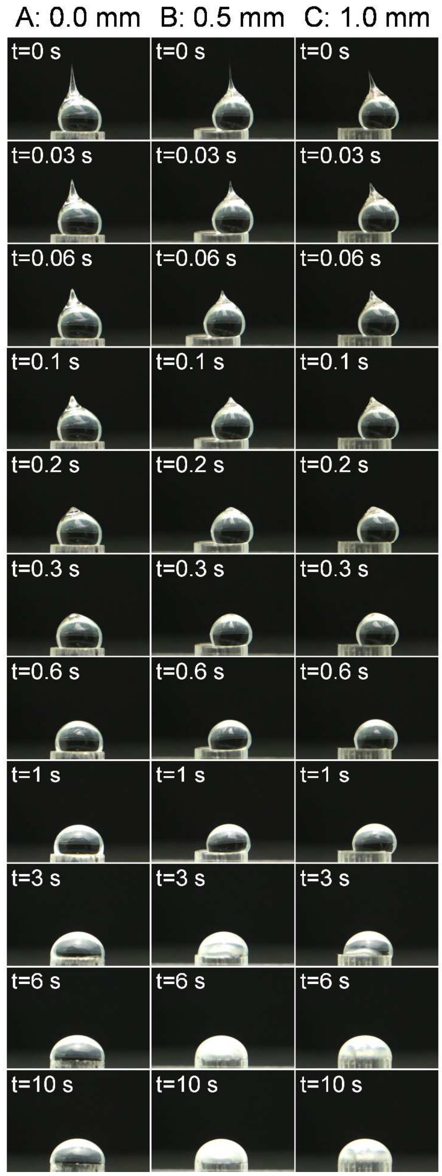

Figure S4 Time-dependent images of 15-μL lPDMS sessile drops spread on 3-mm PMMA circular disks. The droplets were deposited at (A) 0, (B) 0.5, and (C) 1 mm from the center of the disk. The interfacial tension force draws the viscous lPDMS into spherical cap on the disk.

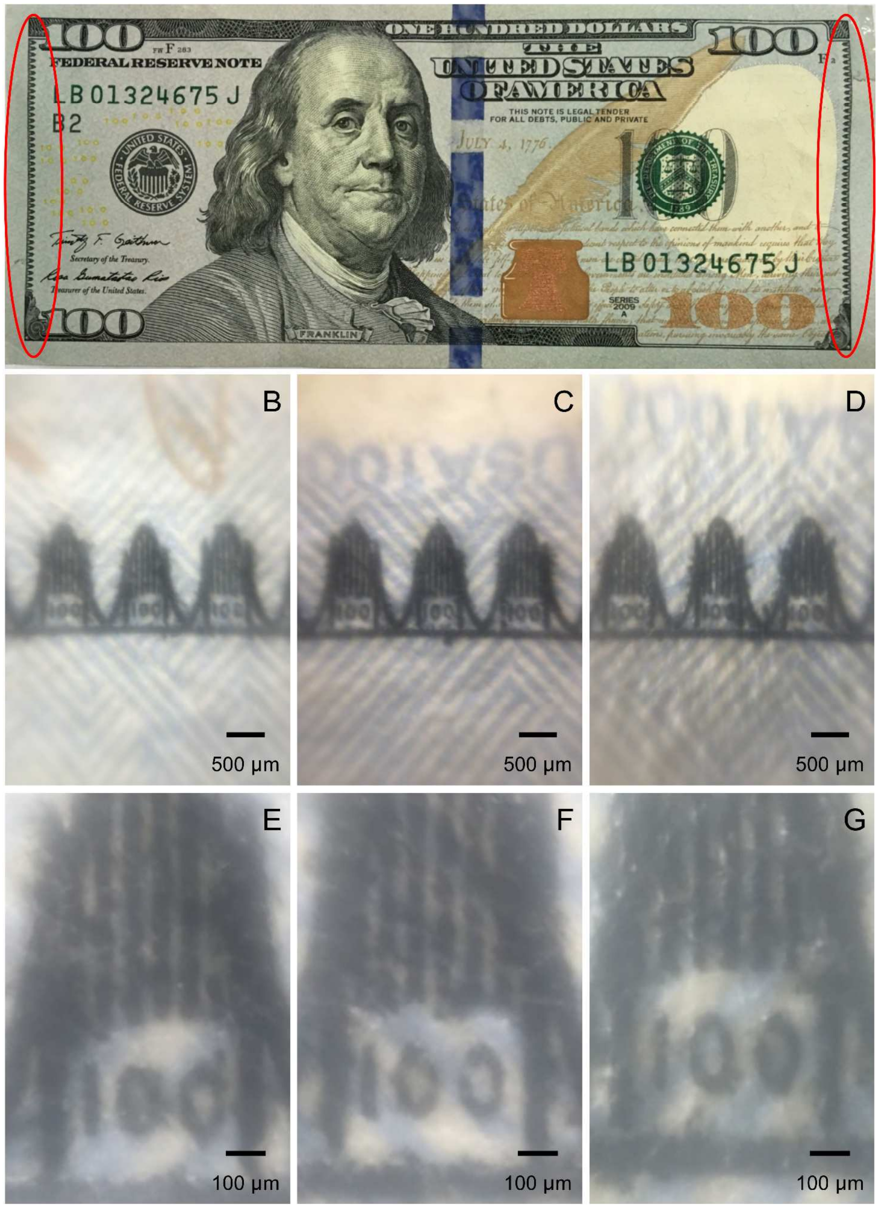

Figure S5 The front side of a new USD 100 banknote. The red circles indicate arrays of micro-printings. Figure S5B-S5D show the microscopic images of micro-printing acquired with 3-mm ePDMS planoconvex lenses. Figures S5E-S5G are the corresponding images with 4X digital zoom. Note: Figures S5B-S5G are the same images as those in Figures 2D-2I.

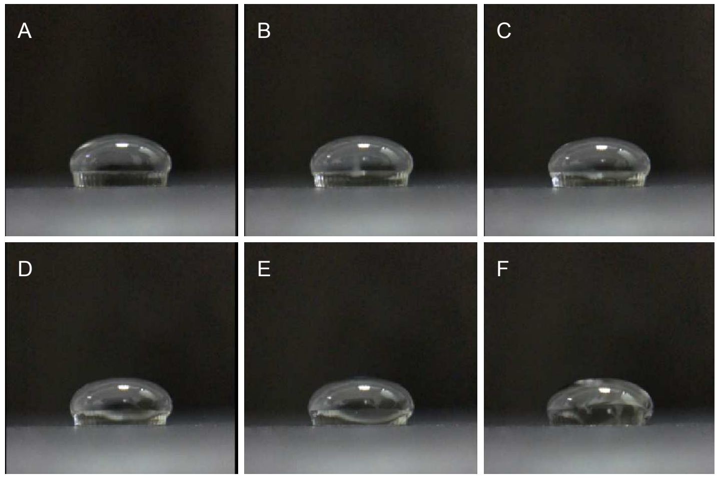

Figure S6 Overflow of 45-μL lPDMS on a 6-mm PMMA disk. The disk cannot hold the droplet as the local contact angle (θ_P) was much greater than the critical angle for spreading over the edge (θ_C) defined by the Gibbs inequality condition. In this case θ_C=90^o. Due to a high viscosity of the lPDMS, it took more than 10 min for the overflowing to occur. A longer time is required for a more viscous lPDMS (i.e., after aging for 30 min at room temperature).

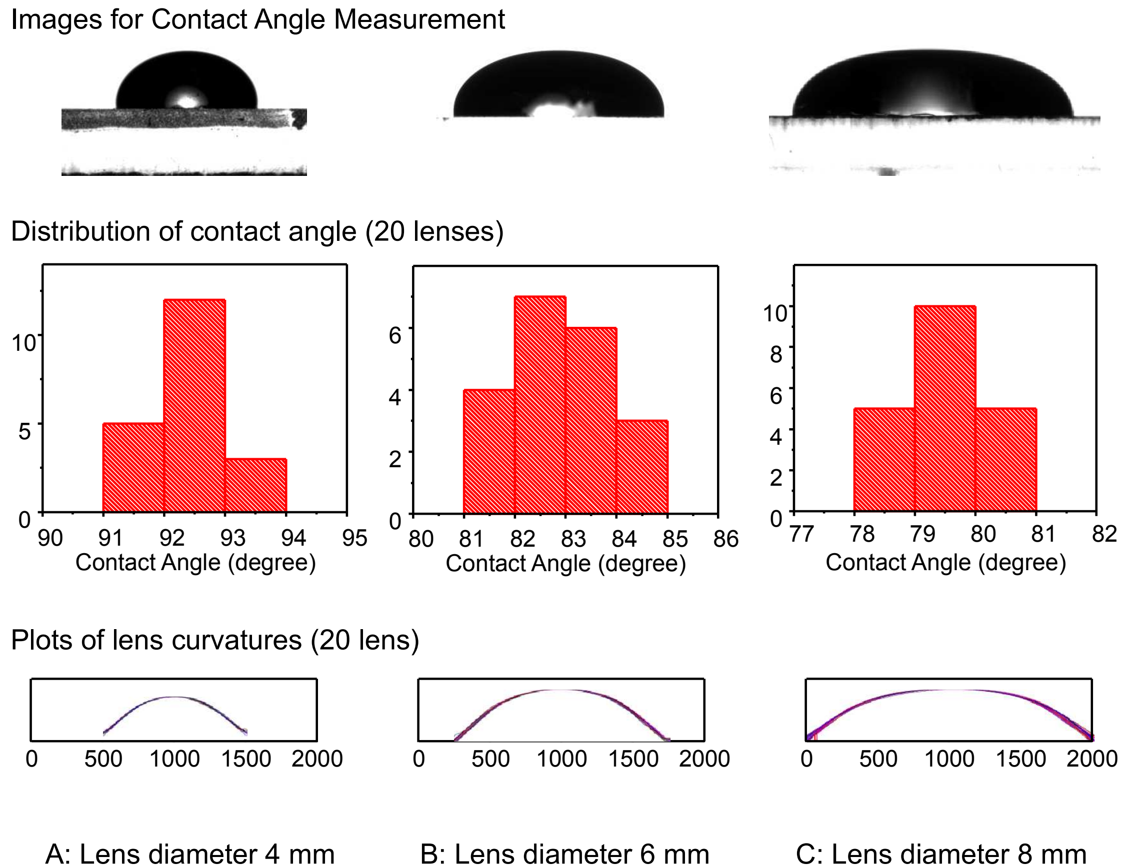

Figure S7 Contact angles and curvatures of ePDMS planoconvex lens with diameter of (A) 4 mm, (B) 8 mm, and (C) 8 mm. The contact angles were measured from the images taken by the photographic capability of a standard goniometer (Model 200-F1, Ramé-Hart Instrument Co., USA). The lens curvatures were extracted from the contrast of the images by a MATLAB program. A set of 20 lenses was employed for each diameter. The narrow distributions indicate the reproducibility of the fabrication method.

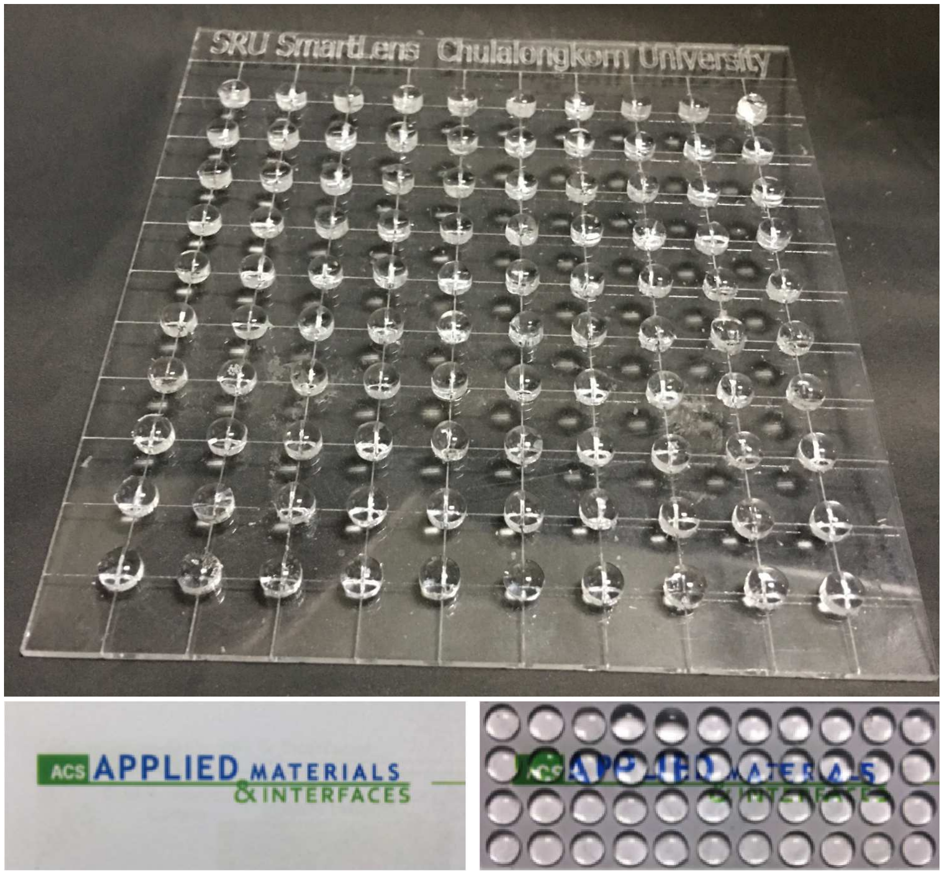

Figure S8 A set of 100 ePDMS planoconvex lenses (5-mm diameter) fabricated by the confined sessile drop technique and their optical effect when placed on printed characters.

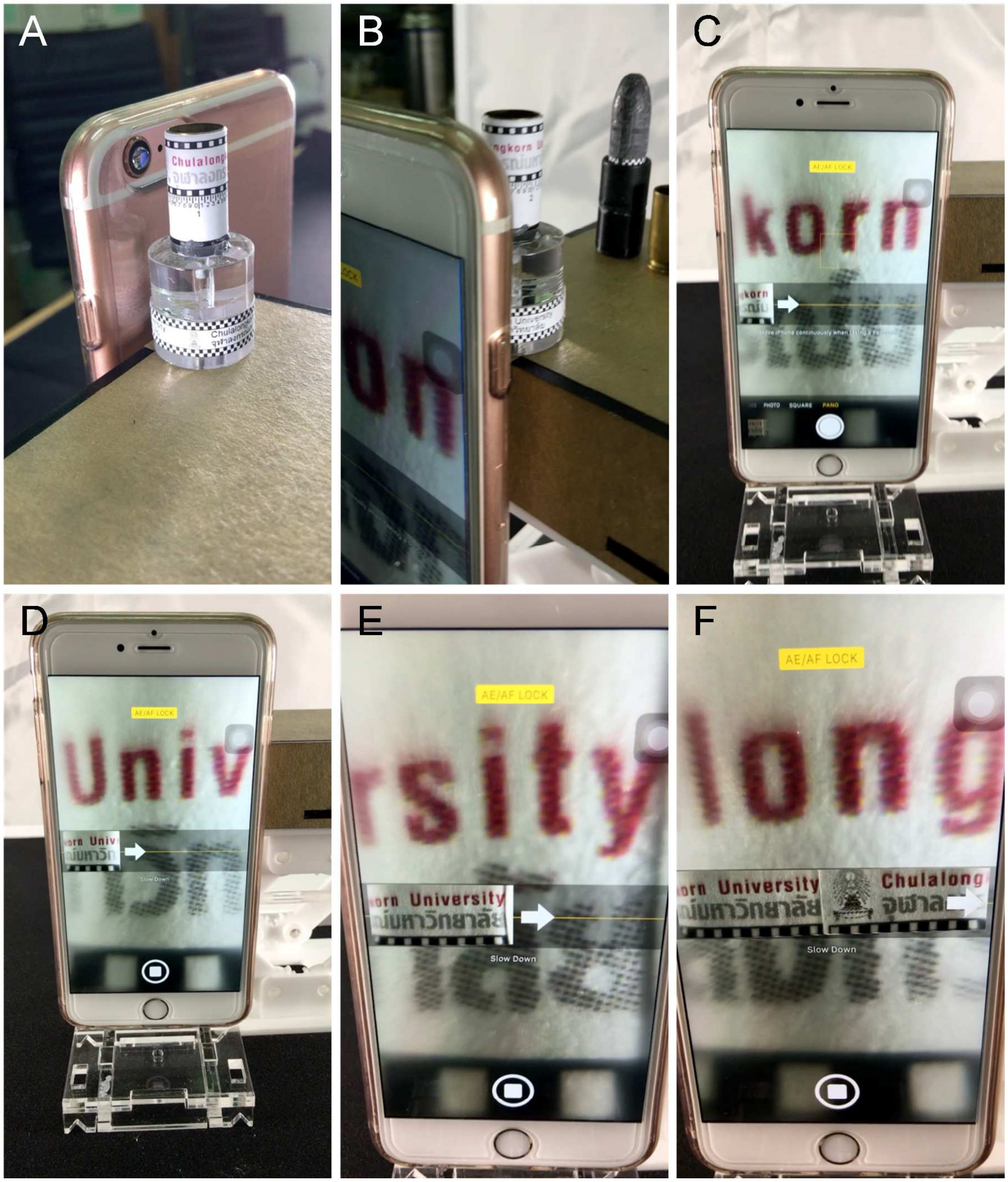

Figure S9 A series of still images show an experiment setup and panorama microscope imaging using a smartphone microscope equipped with a 5-mm ePDMS planoconvex lens and homemade rotating device. The device was rotated at 3 rpm while smartphone microscope taking panorama image of the 3.3 mm x 1.4 mm paper strip wrapped around a 10 mm cylinder. The panorama app stitched the images on-the-fly.

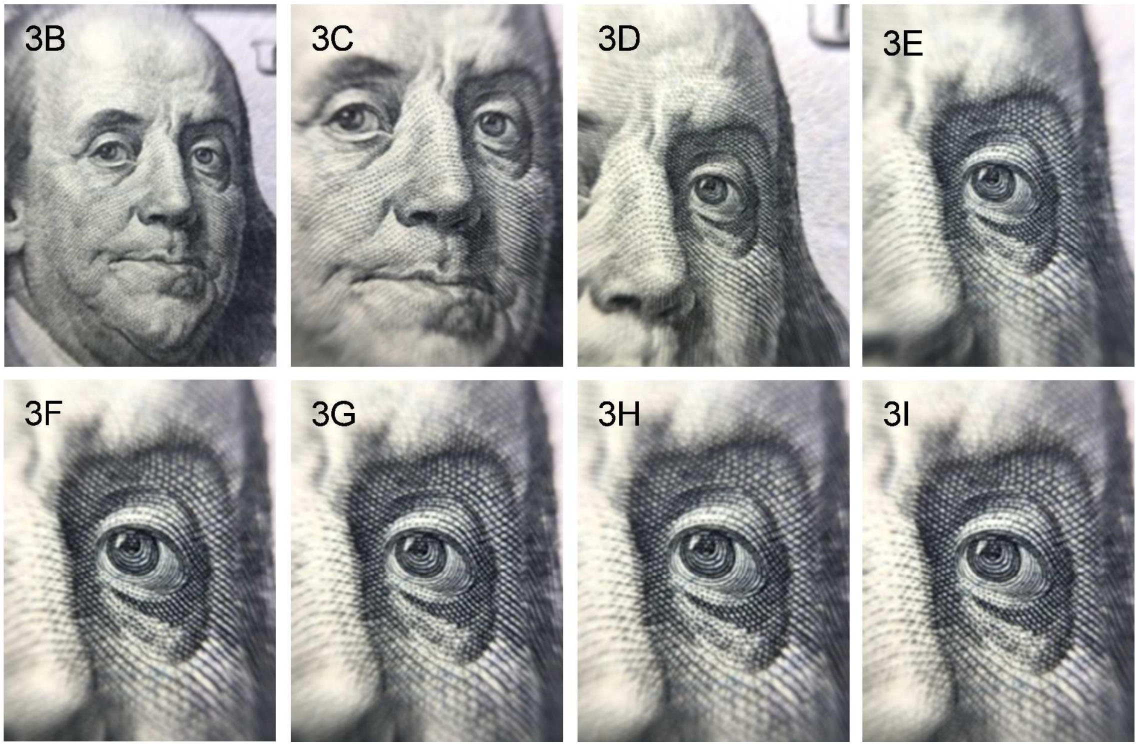

Figure S10 High-resolution microscopic images of Figures 3B - 3I. The microscopic images of the Benjamin Franklin's eyes on the front side of a new USD100 banknote acquired by an iPhone 6S plus coupled with 6-mm ePDMS planoconvex lens made from (B) 5, (C) 10, (D) 15, (E) 20, (F) 25, (G) 30, (H) 35, and (I) 40 μL lPDMS.

Figure S11 High-resolution panorama microscopic images of Figure 7D.