Supplemental Document

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Polyvinyl chloride gels microlens array with a well-controlled curvature obtained by solvent evaporation under DC electric fields: supplement

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Polyvinyl Chloride Gels Microlens Array with Well-controlled Curvature Obtained by Solvent Evaporation under DC Electric Field

The real-scaled image of the PVC gels solution, as shown in Figure. S1 (a). The mixture looked transparent and suitable for the fabrication of optical lenses. The real image of the prepared PVC gels MLAs was illustrated in Figure. S1 (b).

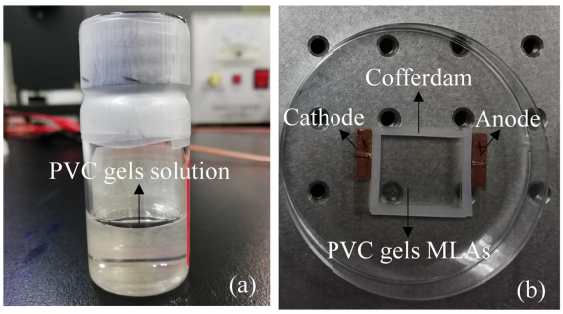

Figure S1. Images of: (a) mixture PVC gels solution and (b) prepared PVC gels MLAs.

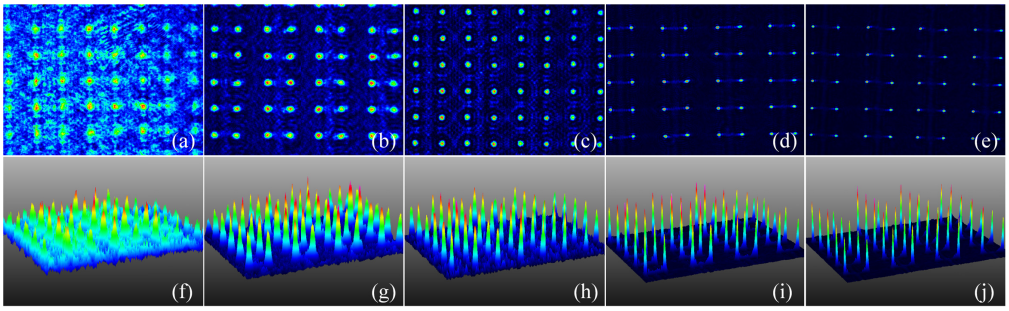

Figure. S2. 2D images of the light focusing spot and 3D profiles of light at the focusing plane of PVC gels MLAs prepared by evaporation of THF from 100 µL PVC gels solution under different voltages: (a, f) V = 10 V, (b, g) V = 20 V, (c, h) V = 30 V, (d, i) V = 40 V and (e, j) V = 50 V.

The light distributions of PVC gels-based MLAs prepared by evaporation of THF from 100 µL PVC gels solution under different voltages are collected in Figure S2, while the experimental setup is shown in Figure 7. Under 10 V DC field, the formed PVC gels exhibited lens array effect with some noise (Figure S2(a,f)). The extension of the DC field to 20 V led to the formation of uniform PVC gels-based MLAs (Figure S2(b,g)). The light distributions of PVC gels-based MLAs under 30 V, 40 V and 50 V DC fields are depicted in Figure S2(c,h)), Figure S2(d, i) and Figure S2(e,j)), respectively. The uniform colour implied that the lens had excellent focusing properties.

The optical images of PVC gels-based MLAs prepared by evaporation of THF from 100 µL PVC gels solutions under different voltages. A more precise image array of 4 was observed as illuminated by white light. Thus, the PVC gels-based MLAs possessed high optical performances.

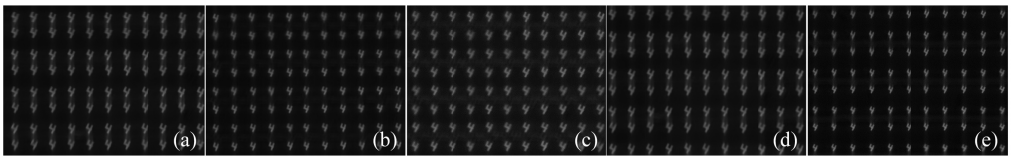

Figure. S3. Optical images of an array of the number "4" observed through PVC gels MLAs prepared by evaporation of THF from 100 µL PVC gels solution under different voltages: (a) V = 10 V, (b) V = 20 V, (c) V = 40 V, (d) V = 40 V and (e) V = 50 V.

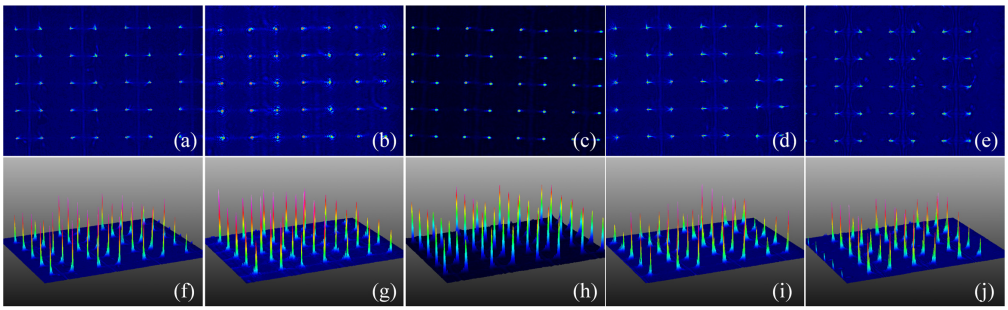

Figure. S4. 2D images of the light focusing spot and 3D profiles of light at the focusing plane of PVC gels MLAs prepared by evaporation of THF under 50 V DC field with different volumes of PVC gels solution: (a, f) 60 µL, (b, g) 80 µL, (c, h) 100 µL, (d, i) 120 µL and (e, j) 140 µL.

2D images of the light focusing spot and 3D profiles of light at the focusing plane of PVC gels-based MLAs prepared by evaporation of THF under 50 V DC field with different volumes of PVC gels solutions are shown in Figure S4. The experimental setup is provided in Figure 7. The light distributions revealed that PVC gels-based MLAs had good light focusing properties. At the volume of PVC gels solution of 100 µL, the focusing properties of as-obtained PVC gels-based MLAs were the best among all samples.

The optical images of PVC gels-based MLAs prepared by evaporation of THF under 50 V DC field with different volumes of PVC gels solution are given in Figure. S5. The transparent observed four arrays implied uniform PVC gels-based MLAs with good optical performances.

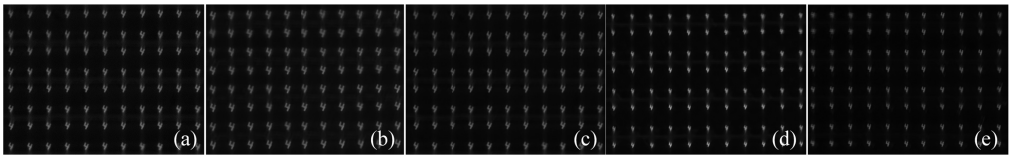

Figure. S5. Optical images of an array of number "4" observed through PVC gels-based MLAs prepared by evaporation of THF under 50 V DC field with different volumes of PVC gels solution: (a) 60 µL, (b) 80 µL, (c) 100 µL, (d) 120 µL and (e) 140 µL.

The surface profiles of PVC gels lens were measured by WLI. The obtained curves were dotted lines and the curves after Gaussian fitting were solid lines, as Figure S 6 shows. In Figure S6 (a), the PVC gels MLAs were fabricated by evaporating THF of 100 µL PVC gels solution under 10V, 20V, 30V, 40V, 50V voltages. In Figure S6 (b), the PVC gels MLAs

were obtained by the evaporating THF of PVC gels solution with volumes of 60 μL, 80 μL, 100 μL, 120 μL, 140 μL under 50V voltage.

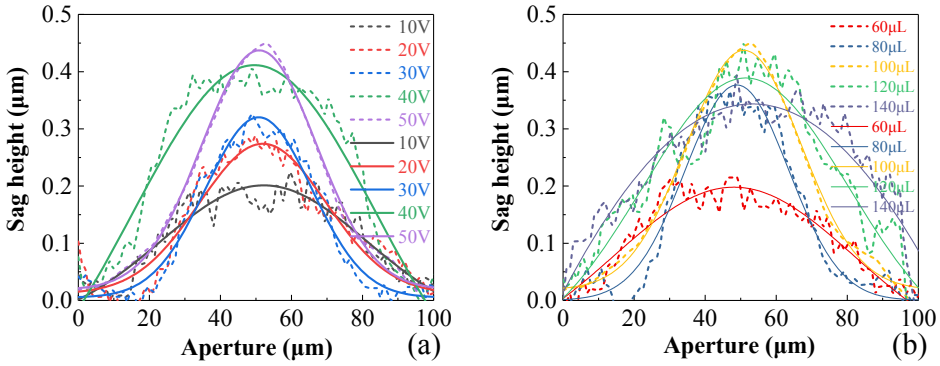

Figure S6, The sag height of PVC gels MLAs before (dotted lines) and after Gaussian fitting (solid lines), (a) the evaporation of THF of 100 μL PVC gels solution under different voltage, (b) the evaporation of THF of PVC gels solution with different volumes under 50 V voltage.