Figure S1:

(a) Figure S1a: Comparison of intensity profiles of optimized super-oscillatory hotspots and Gaussian functions for fixed ΔN = 1.0λ and varying spot size (DN) of 0.28λ, 0.33λ, 0.39λ, 0.44λ and 0.56λ.

(b) Figure S1b: Comparison of intensity profiles of optimized super-oscillatory hotspots and Gaussian functions for fixed ΔN = 1.6λ and varying spot size (DN) of 0.28λ, 0.33λ, 0.39λ, 0.44λ and 0.56λ.

Matlab \*.mat files containing the data from simulation, and \*.m files to produce the figures in figure S1. Also included are Matlab figure files.

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Figure S2:

(a) Figure 2a: Amplitude and phase profiles of the mask creating superoscillatory hotspot of DN = 0.33λ, NA=1. Matlab \*.mat files containing the data from Hankel transform calculation, and \*.m files to produce the figure S2a.

(b) Figure 2b: Amplitude and phase profiles of the mask creating superoscillatory hotspot of DN = 0.39λ, NA=1. Matlab \*.mat files containing the data from Hankel transform calculation, and \*.m files to produce the figure S2b.

(c) Figure 2c: Amplitude and phase profiles of the mask creating superoscillatory hotspot of DN = 0.33λ, NA=0.9. Matlab \*.mat files containing the data from Hankel transform calculation, and \*.m files to produce the figure S2c.

(d) Figure 2d: Amplitude and phase profiles of the mask creating superoscillatory hotspot of DN = 0.39λ, NA=0.9. Matlab \*.mat files containing the data from Hankel transform calculation, and \*.m files to produce the figure S2d.

Also included are Matlab figure files.

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Figure S3:

FDTD simulated and experimentally measured transmission spectra of the first four metamolecules in a periodic arrangement (detailed geometric parameters are given in the main text). Matlab \*.mat files containing the data from Hankel transform calculation, and \*.m files to produce the figure S3.

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Figure S4:

(a) Figure S4a: Pixilation effect of the metamaterial mask for creating super-oscillatory hotspots for fixed ΔN = 1.0λ and varying DN of 0.28λ, 0.33λ, 0.39λ, 0.44λ and 0.56λ. Matlab \*.mat files containing the data from two-dimensional angular spectrum simulation, and \*.m files to produce the figures in figure S4a. Also included are Matlab figure files.

(b) Figure S4b: Pixilation effect of the metamaterial mask for creating super-oscillatory hotspots for fixed ΔN = 1.6λ and varying DN of 0.28λ, 0.33λ, 0.39λ, 0.44λ and 0.56λ. Matlab \*.mat files containing the data from two-dimensional angular spectrum simulation, and \*.m files to produce the figures in figure S4b. Also included are Matlab figure files.

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Figure S5:

SEM images of metamaterial superlenses with different ΔN and DN studied in this work. The ones with suffix of ‘\_002’ are shown in the supplemental Figure S5, suffix of ‘\_001’ shows the images in larger area. No associated data.

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Figure S6:

Schematic image to show the experiment setup for characterization of metamaterial superlens. No associated data.

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