Electronic Supplementary Information (ESI) for *Chemical Communications*

Mg plasmonics for UV applications and chiral sensing

Hyeon-Ho Jeong, [a,b] Andrew G. Mark, [a] and Peer Fischer [a,c,*]

[a] Max Planck Institute for Intelligent Systems, Heisenbergstr. 3, 70569 Stuttgart, Germany
[b] Institute of Materials, E´cole Polytechnique Fe´de´rale de Lausanne (EPFL), CH-1015 Lausanne, Switzerland
[c] Institute for Physical Chemistry, University of Stuttgart, Pfaffenwaldring 55, 70569 Stuttgart, Germany
*Email: fischer@is.mpg.de

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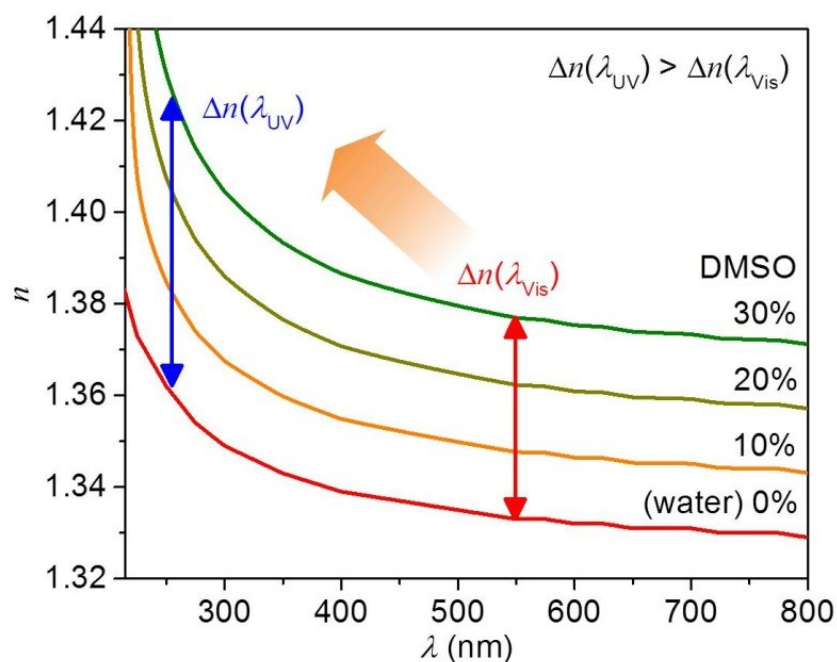
Supplementary Figures

Fig. S1 Dispersion of molecular refractive index of dimethyl sulfoxide (DMSO) for four different concentrations (red: 9%, orange: 10%, yellow: 20%, and green: 30%) as a function of wavelength. The original data of the refractive indices of DMSO and water were obtained from ref. 12 and ref. 13 respectively. The medium refractive index is calculated by the Eqn. 3 in the main text. Each arrow indicates the change in refractive index according to the change in the molecular concentration at two different wavelengths (blue: UV, red: visible).
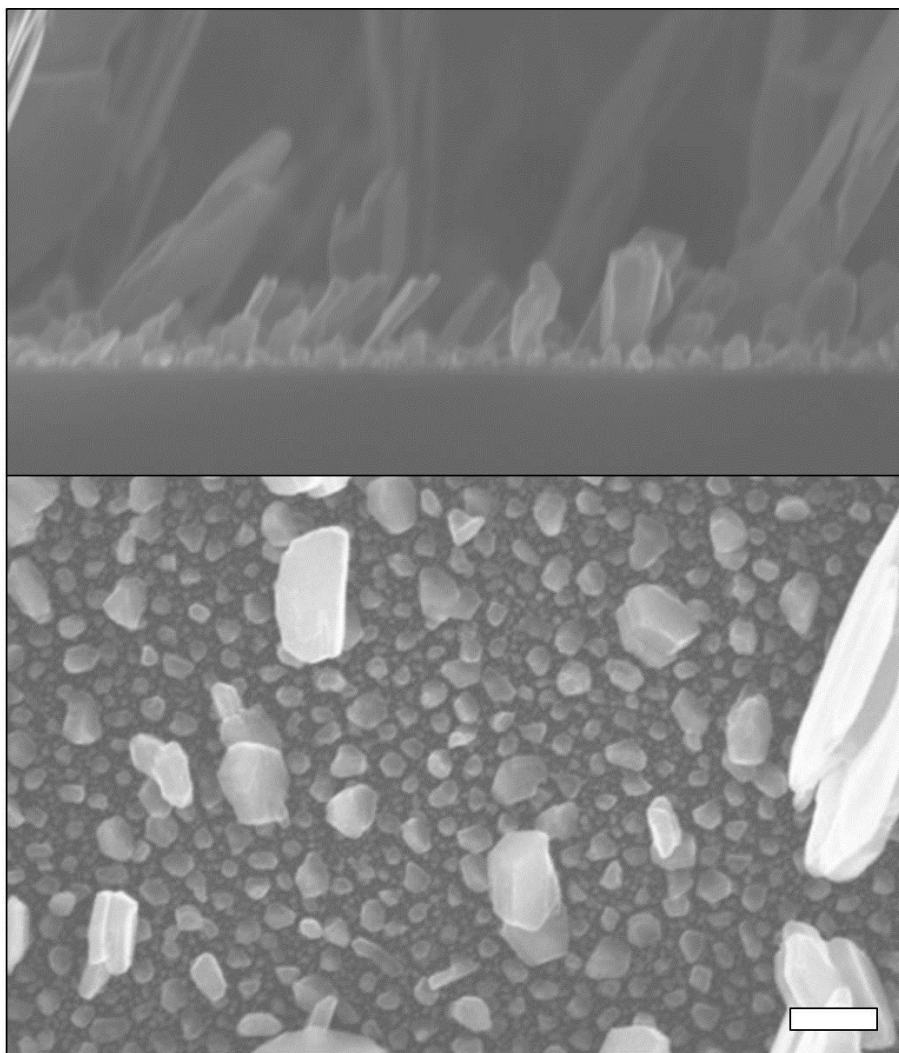
Fig. S2 SEM images of pure Mg grown by nanoGLAD with rotation, but no helices are formed (Scale bar: 200 nm).
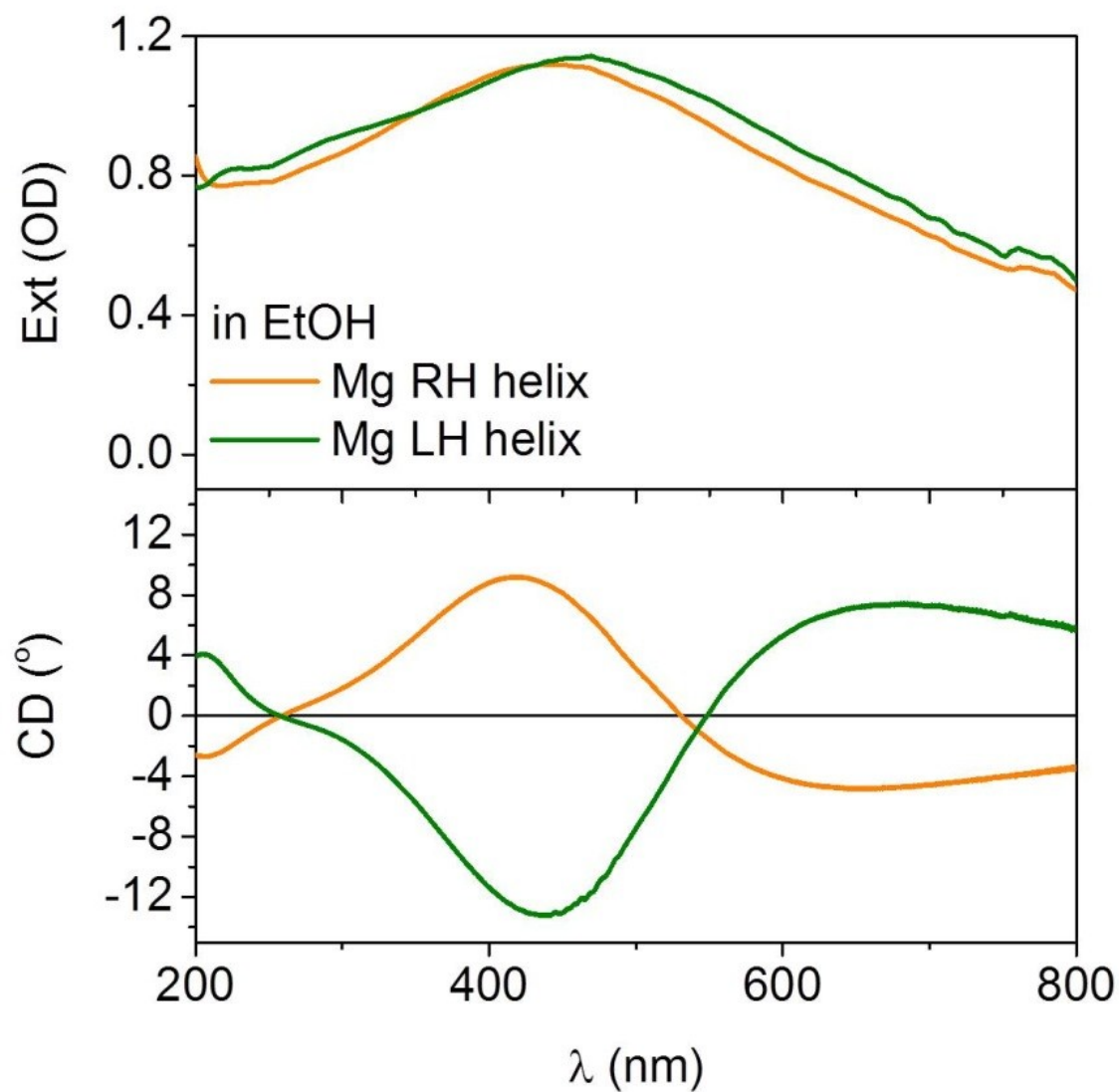
Fig. S3 Extinction (upper panel) and CD (lower panel) spectra of Mg nanohelices in ethanol. Green and orange lines indicate different chirality of nanohelices, LH and RH, respectively.
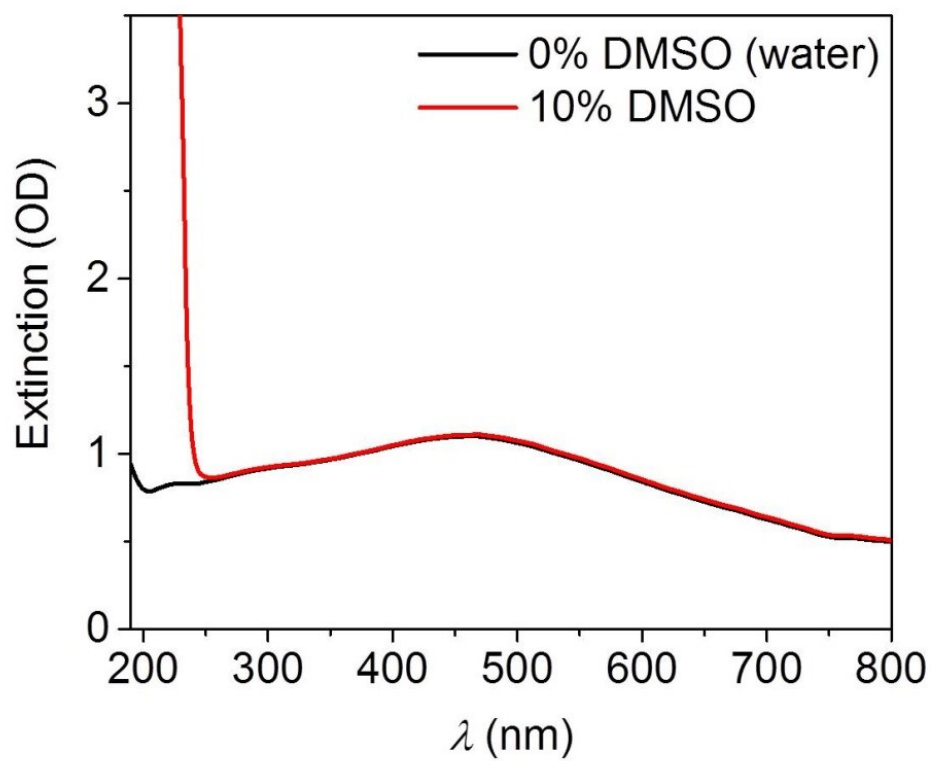
Fig. S4 Extinction spectra of Mg LH nanohelices in water (black line) and 10% DMSO (red line).

Supplementary Discussions

Experimental setup

For the CD measurement the glass substrate with a layer of Mg nanohelices is immersed in a cuvette, as shown in Supplementary .
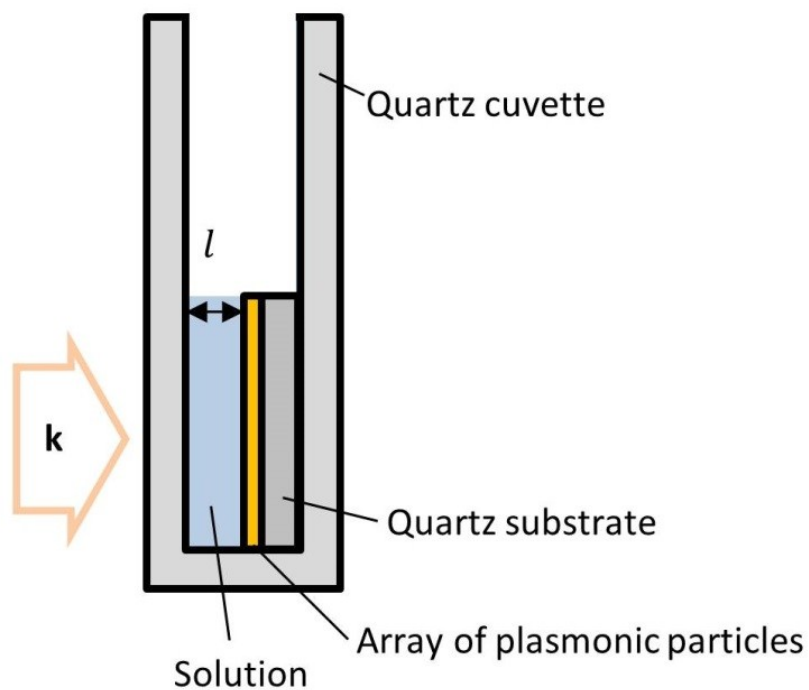

Fig. S5 Cuvette containing the solution in which the quartz substrate with the Mg nanohelix film is immersed.

Polarisation dependent extinction

The Circular dichroism (CD) is the difference between the extinctions for left and right handed polarised light [21]

$$CD \; [^o] = \Delta E \; \frac{4}{\ln 10} \frac{\pi}{180^o},$$
(1)

where

$$\Delta E = E_L - E_R.$$
(2)

The extinction for unpolarised light E_T can be expressed in terms of the extinctions for left and right handed circularly polarised light as

$$E_T = \frac{E_L + E_R}{2}.$$
(3)

Combining this with Eqns. 1and 2 gives

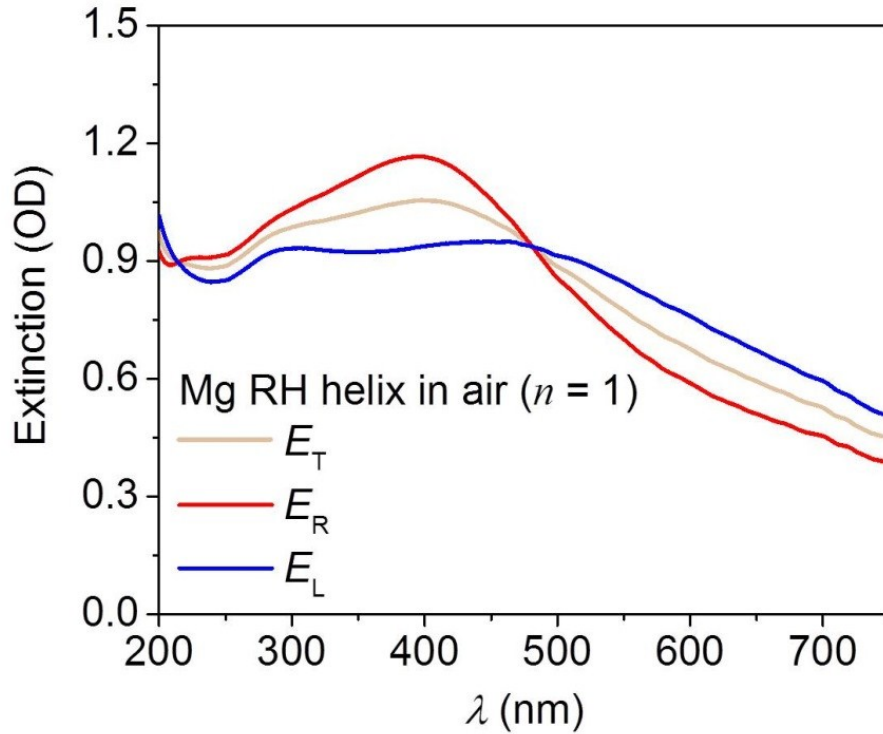$$E_{L/R} = E_T \pm \frac{\Delta E}{2}$$
(4)

Fig. S6 Extinction spectra of the Mg RH nanohelices in air in response to the unpolarised light (E_T, orange) and the circularly polarised light (LCP: E_L, blue and RCP: E_R, red).