

Supporting Information

**Light Induced Reversible Structuring of Photosensitive Polymer
Films**

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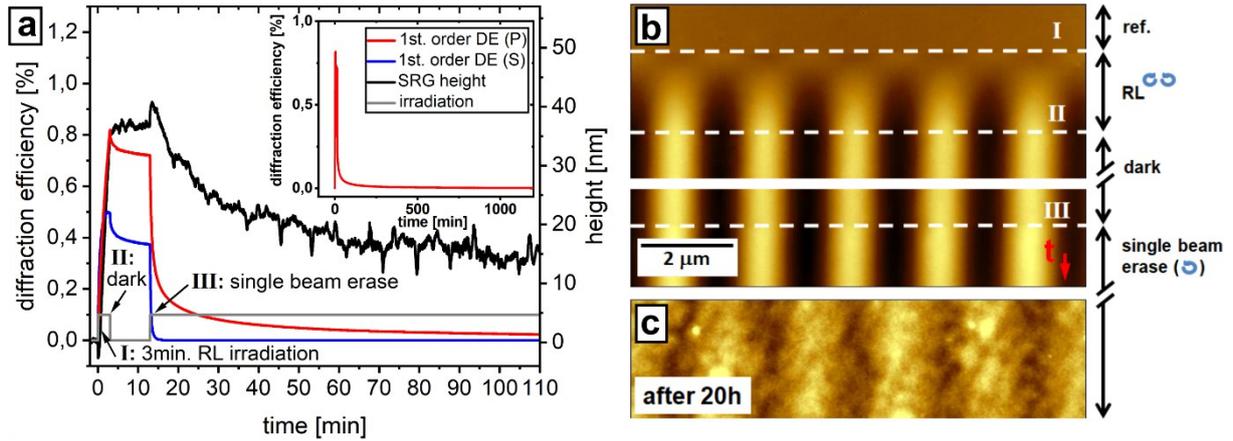


Figure S1. Single beam erasure experiment of the SRG in Pazo film. (a) *In-situ* recorded SRG height (black curve) and in- (red curve) and out- (blue curve) of plane components of the 1st diffraction order DE signal as a function of time. Gray line depicts illumination steps. The polymer film was irradiated with RL interference pattern for 3 min resulting in 40nm SRG height (see AFM topography in “b”). Afterwards the irradiation was switched off for 10min. The DE signals decrease with time, while the SRG height is constant. In the following step, the circular polarized erase beam was switched on resulting in drop of the SRG height and DE signal. (b) *In-situ* recorded AFM micrograph showing the change in the SRG height as a function of time. The scanning is started at the top in dark where the topography is flat followed by 3min irradiation with RL IP started at point marked by Ist and stopped at II^d dashed white line, after 10 minutes scanning in dark, the circular polarized erasure beam is switched on (III^d dashed white line). (c) Polymer film surface after 20 hours of single beam irradiation. The SRG height is 4 nm and the DE has residual value indicating still the presence of birefringent phase grating. ($I_{RL} = 200mW/cm^2$; $I_{single\ beam} = 100mW/cm^2$; $\Lambda = 2\mu m$; $h_{Pazo} = 1000nm$).

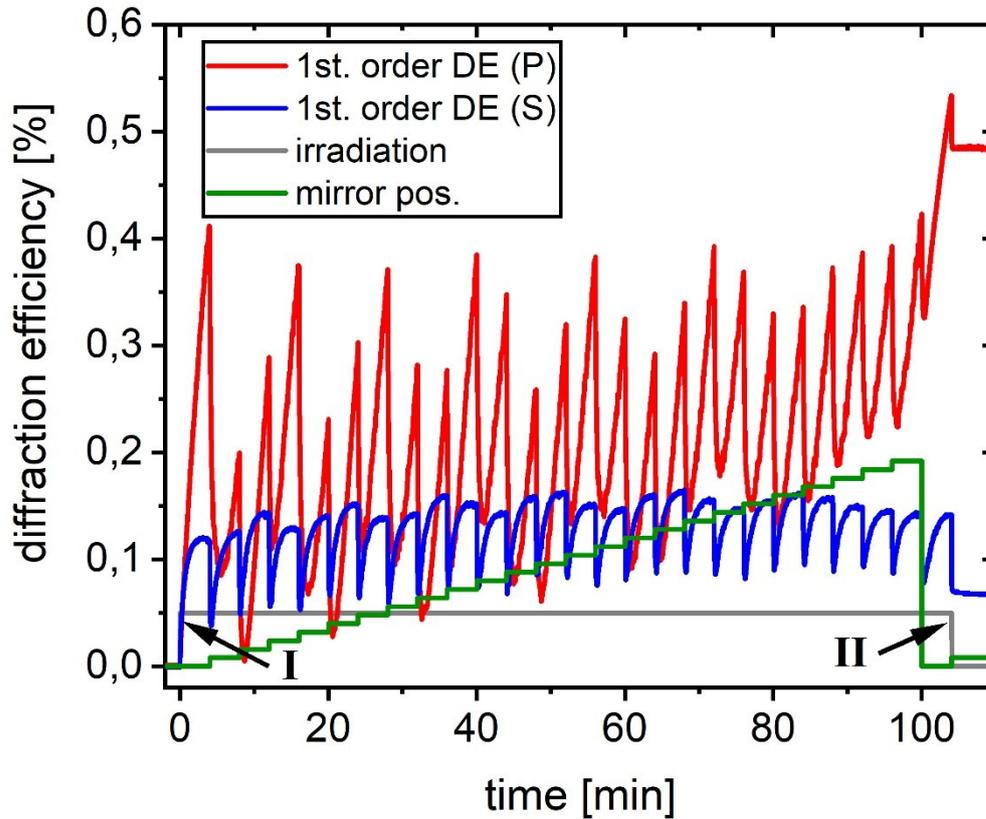


Figure S2. Diffraction efficiency corresponding to the *in-situ* AFM micrograph of the continuously shifting experiment in **Figure 6**. The RL IP is shifted 26 times with a saw-tooth pulse by $\approx \lambda/4$ every 4min. In total this is a shift of ≈ 7 periods of the interference pattern. By applying this pulse the SRG is shifted by $\approx 14\mu m$. At the point of IP shift the in- and out-of-plane component of the DE is decreasing followed by fast recovering to the initial state. ($I_{RL} = 200mW/cm^2$; $\Lambda = 2\mu m$; $h_{Pazo} = 1000nm$).

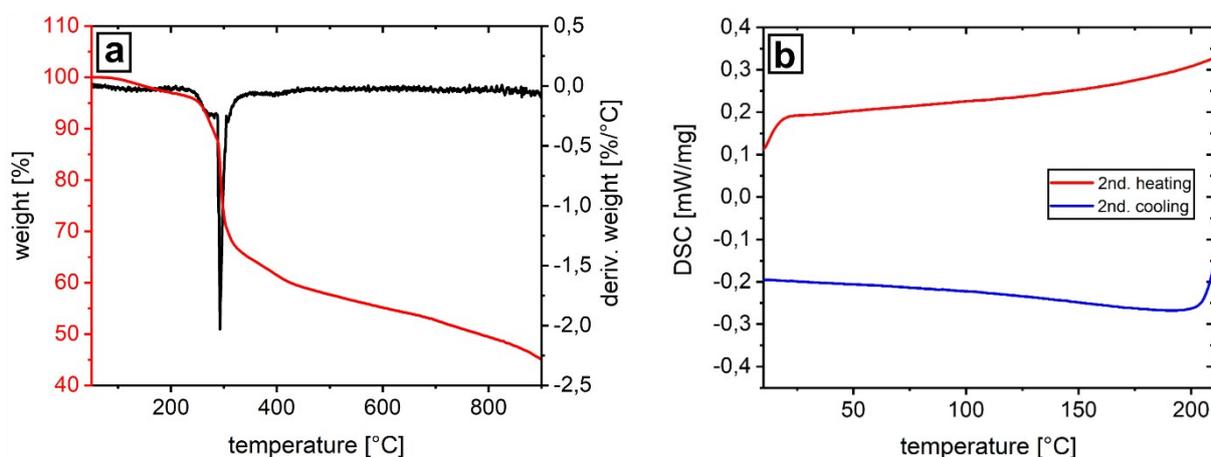


Figure S3. Thermogravimetric analysis (a) and differential scanning calorimetry (b) of the Pazo polymer. At the temperature of 250°C a significant mass loss became noticeable indicating the thermal decomposition. In (b) the second heating and cooling of the sample from 0°C till 200°C with a heating/cooling rate of 10K/min is displayed. The measurement doesn't show any characteristic feature like a glass transition or melting point.