Supplementary Information for

Chemical Reactions with Liesegang Rings: Generation of Non-permanent Thermal Patterns

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S1 Determination of the spacing coefficient

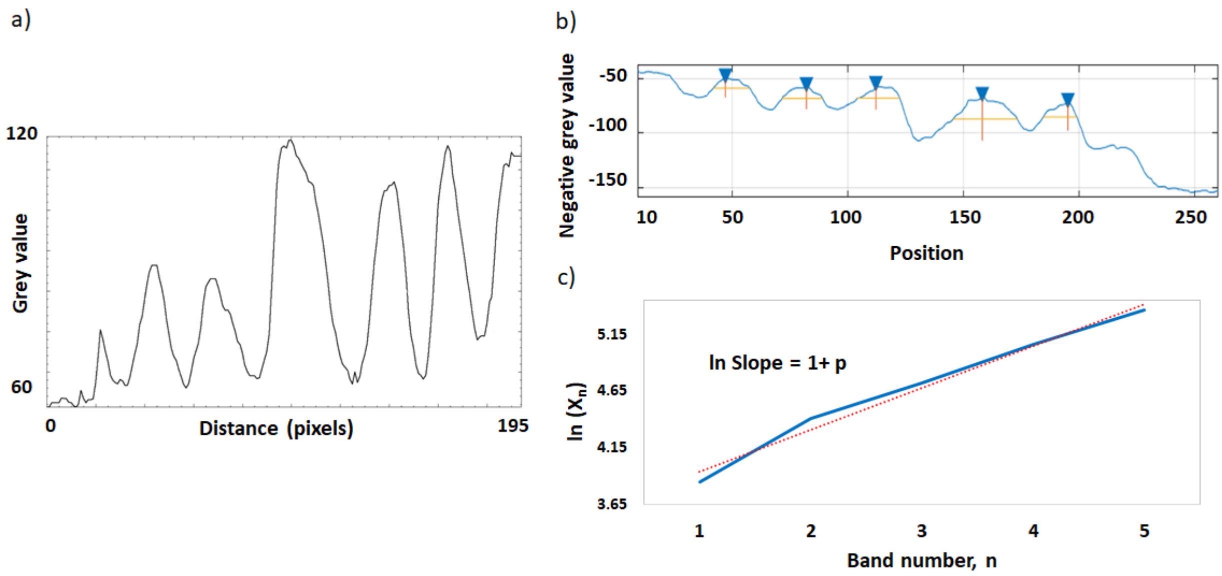

Figure S1. An example of a plot of grey value vs. distance of the bands to the interface of electrolytes using ImageJ analysis. b) The same plot was drawn and analyzed by a homemade MATLAB code, i.e., using the 'Findpeaks' function to find the positions of the bands. c) The natural logarithm of the bands' positions vs. the band number. The slope of this plot provides the spacing coefficient of the LPs.

S2 Preparation of Molds

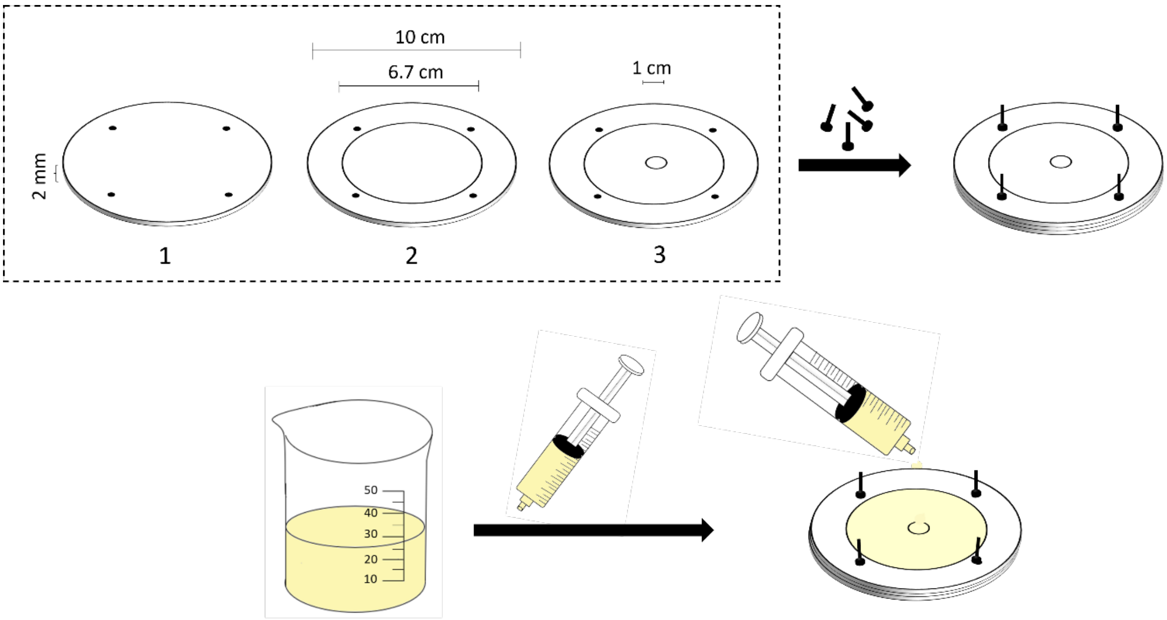

Figure S2. The preparation of the gel molds for LP formation. Three pieces of 2.0 mm thick round plexiglass of outer diameter 10 cm were combined to form the mold for the LP gel. A round hole (6.7 cm × 6.7 cm × 2.0 mm) was cut and removed from the middle piece (2), in which the gel solution with electrolyte was poured and let to gelate. The top piece (3) was also cut into a 1.0 cm diameter hole at the center to enable the outer electrolyte addition. The middle piece was sandwiched between the bottom (1) and top (3) pieces, and the assembly was fixed with screws. The gel solution containing the inner electrolyte solution was transferred to these molds with a 10 mL syringe.

S3 The Effect of Gel Type on Width and Spacing Coefficient

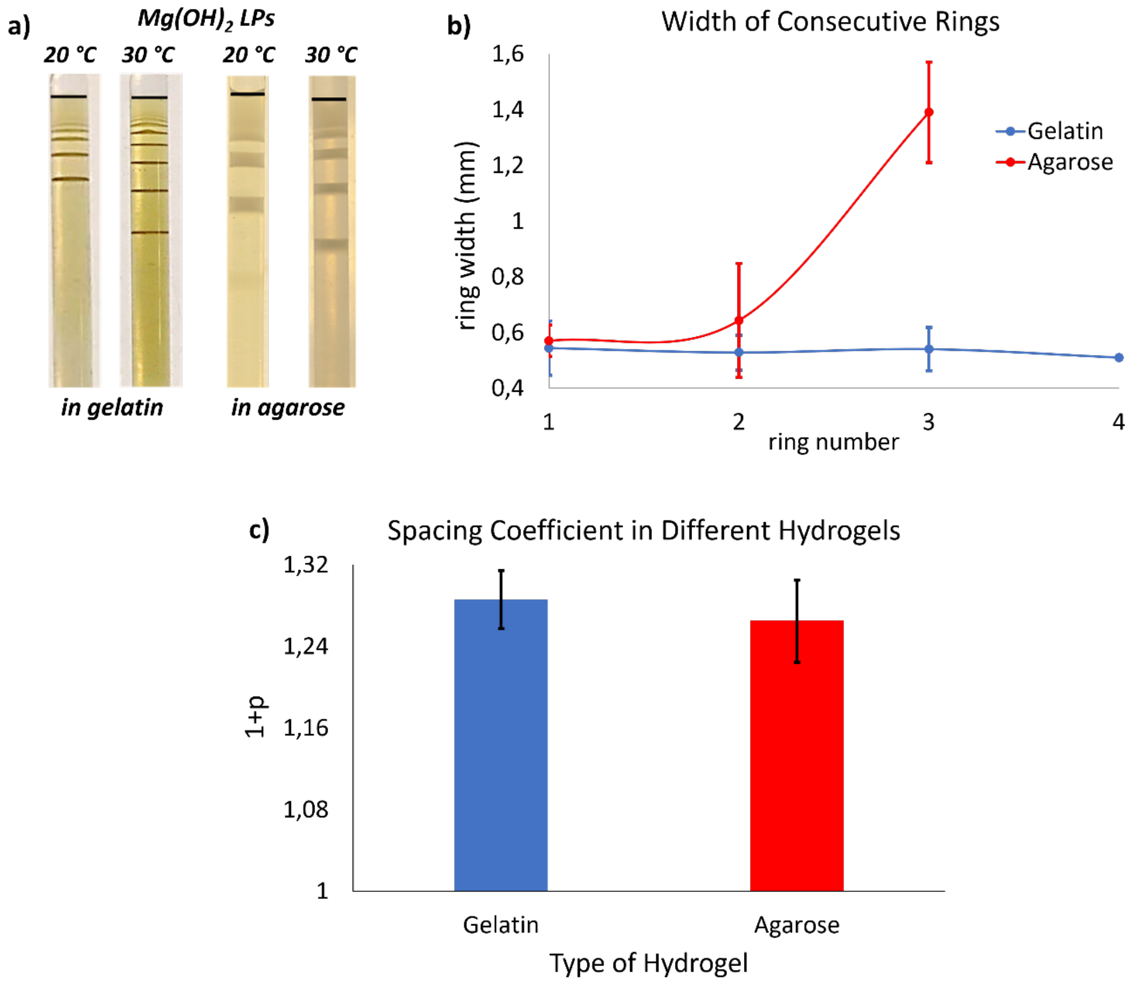

Figure S3. a) The visible image of the LP bands formed through 1D diffusion at two different temperatures. Higher temperature leads to a higher number of bands which are narrower. b) The width of the LP rings formed by 2D diffusion in 7.0% w/v gelatin (0.20 M $MgSO_4$) and 3.0% w/v agarose (0.050 M $MgSO_4$) gels. Patterns developed are much broader in agarose hydrogel. c) Spacing coefficient of the 2D magnesium hydroxide rings in the corresponding hydrogel media.

S4 Non-permanent IR LP Patterns on Agarose

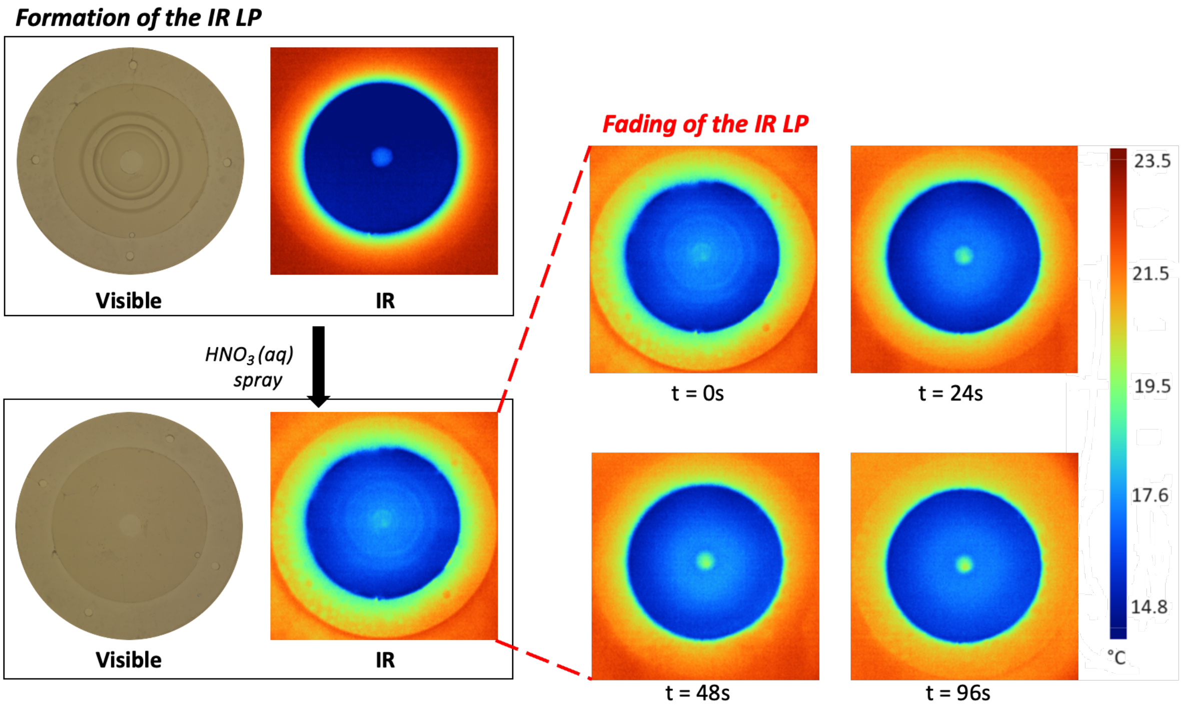

Figure S4. The formation and fading of thermal patterns. a) $Mg(OH)_2$ LP rings formed previously in the 3.0% agarose medium were sprayed with 7.0 M HNO_3, which initiated an exothermic neutralization reaction. b) The thermal patterns lasted about two minutes under these conditions and completely disappeared. (The visible LP was formed in a system where the inner electrolyte concentration was 0.050 M $MgSO_4$, and the outer electrolyte concentration was 6.93 M NH_4OH. The gel was washed well before the acid spray. Temperature changes were recorded as 0.62 °C, 0.53 °C, and 3.84 °C for the inner, middle, and outer rings, respectively. See Figure 3 for the same experiment with the LPs in gelatin.)

S5 IR Spectra of $Mg(OH)_2$ and $Mg(NO_3)_2$

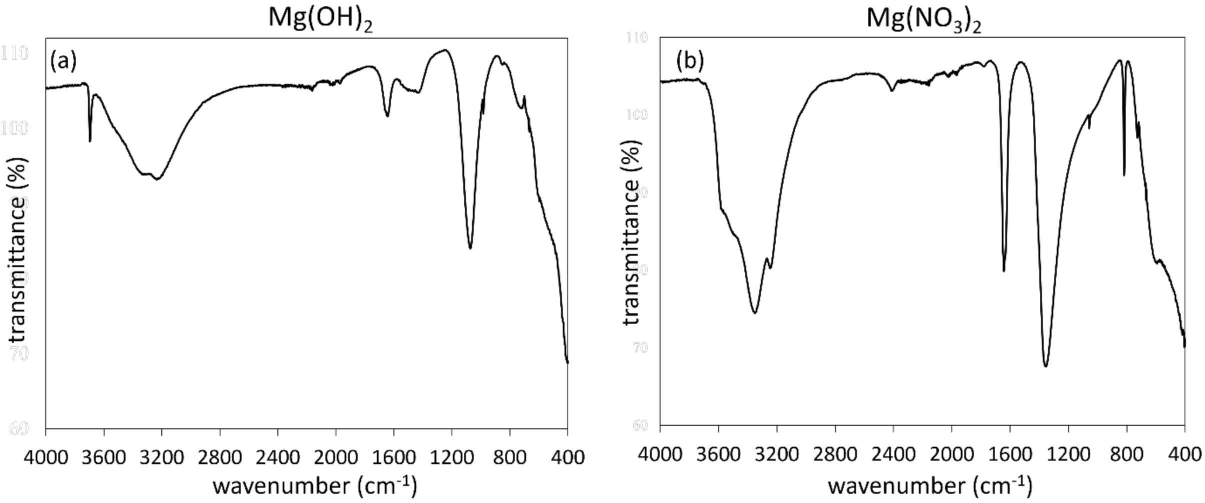

Figure S5. (a) The IR spectrum of a $Mg(OH)_2$ sample prepared through solution-based synthesis and (b) commercial $Mg(NO_3)_2$. The indicative peak of $Mg(OH)_2$ is observed at 3696 cm^{-1}. In commercial $Mg(NO_3)_2$, the characteristic nitrate peaks are observed at 1644 cm^{-1}, 1354 cm^{-1}, and 819 cm^{-1}, which agrees with the acid-treated sample of the main text Figure 4b.

S6 XPS Spectrum of $Mg(OH)_2$

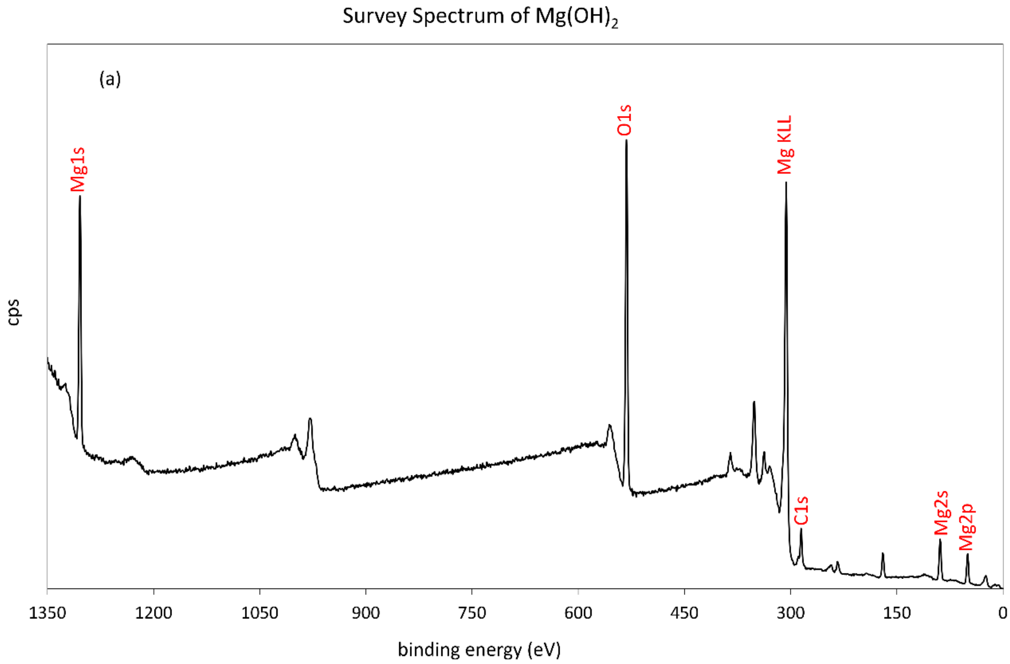

Figure S6. The survey spectrum of The survey spectrum of the $Mg(OH)_2$ sample synthesized through solution-based synthesis.