

Electronic Supplementary Information Description:

The system is prepared using the following experimental procedure: a sample of cadmium chloride nonahydrate $\text{CdCl}_2 \cdot 9\text{H}_2\text{O}$ (Mallinckrodt) is weighed and dissolved in double distilled water to obtain the required concentration. After salt dissolution, 5% w/w powdered gelatin (Difco) is added to the solution. The mixture is then heated with continuous stirring for a few minutes until the entire solid gel material dissolves. The resulting homogenous hot solution is immediately transferred into a circular Plexiglass reactor (diameter = 15 cm) and is covered with a transparent Plexiglass cover (diameter = 12 cm) equipped with spacers in order to achieve a homogeneous gel thickness of 0.7 mm. The cover is connected to a small cylindrical reservoir (diameter = 3 cm) in the center for the outer solution addition. The gel is left in the reactor for 24 hours at room temperature to rest and polymerize. After that, the outer electrolyte, sodium chloride nonahydrate $\text{Na}_2\text{S} \cdot 9\text{H}_2\text{O}$ (Alfa Aesar), is gently added to the central reservoir. Initial pH of outer solution and the gel are respectively around 13 and 4.

movie: A movie exhibiting transition from rings to spots in addition to the ion-exchange yellow back-front. $[\text{Cd}^{+2}]_0 = 80 \text{ mM}$; $[\text{S}^{-2}]_0 = 400 \text{ mM}$. A snapshot is taken every 15 min. The actual duration of the movie is 40 h.