Electronic Supplementary Information

Cation-dependent assembly of hexagonal DNA origami lattices on SiO_2 surfaces

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All AFM images of the time series shown in Figures 1 to 9

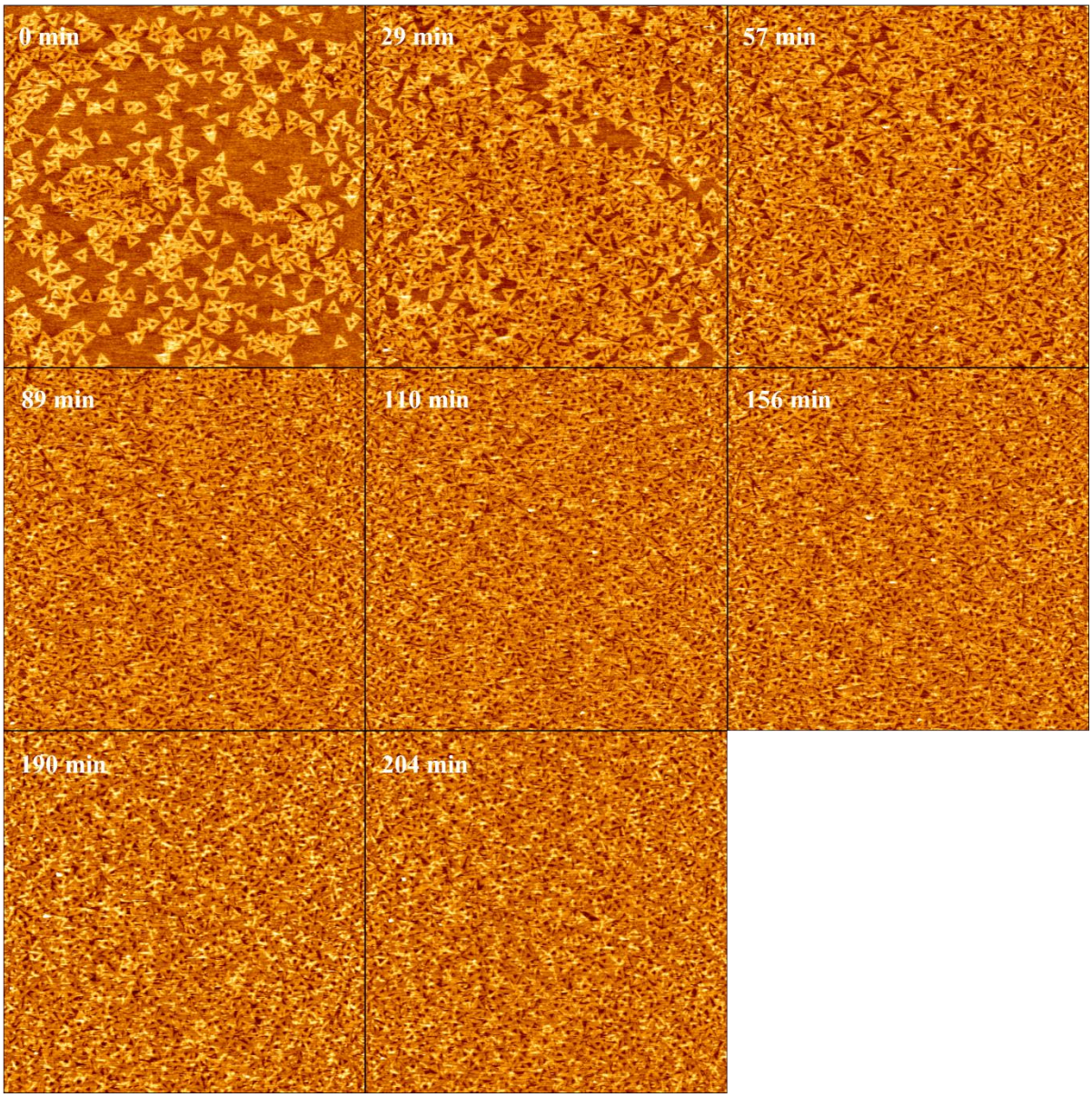

Figure S1: Time-lapse AFM images of DNA origami triangles on a SiO_2 surface in the presence of 12.5 mM $MgCl_2$ and 200 mM NaCl at 20°C.

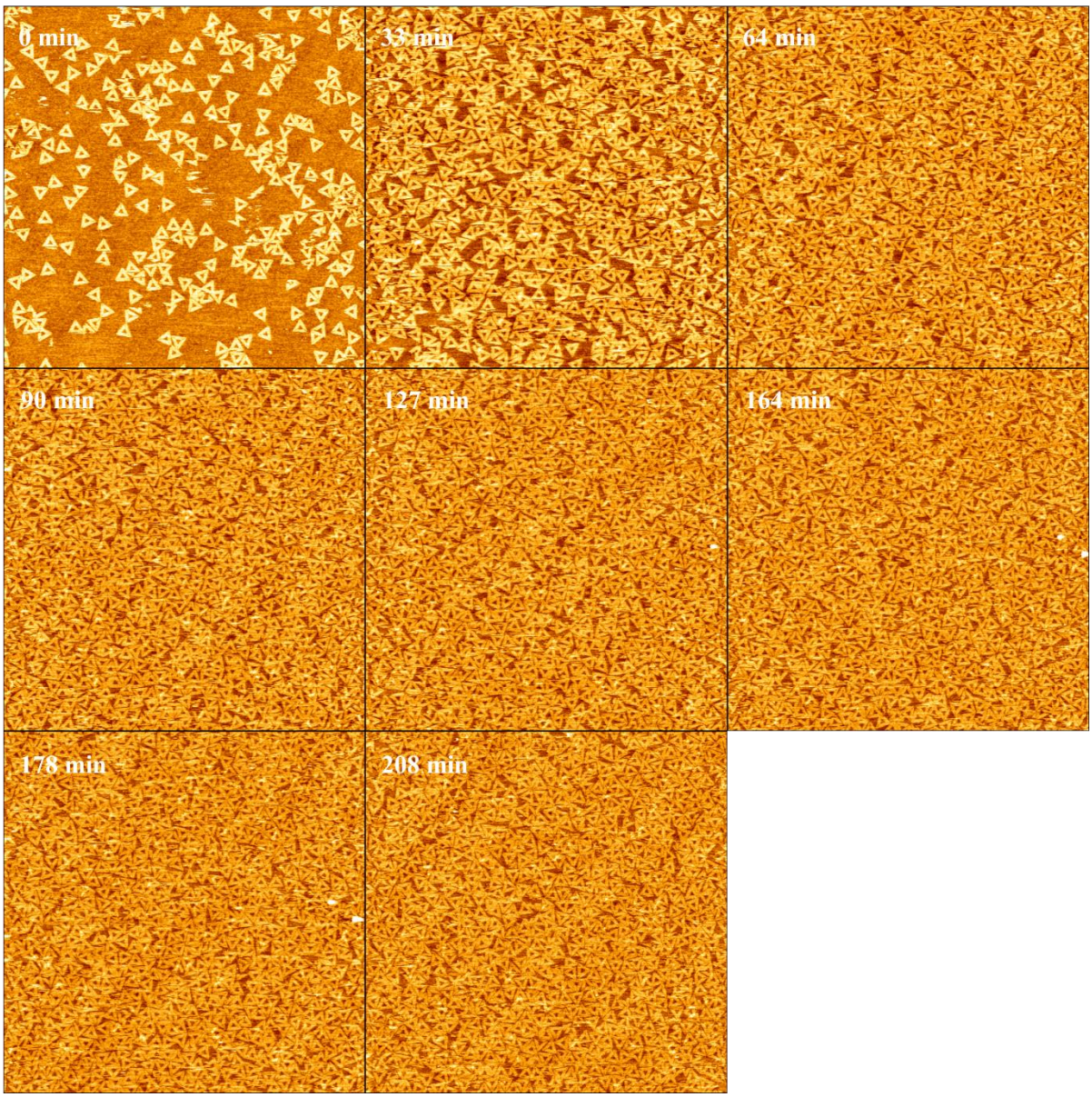

Figure S2: Time-lapse AFM images of DNA origami triangles on a SiO_2 surface in the presence of 12.5 mM $CaCl_2$ and 200 mM NaCl at 20°C.

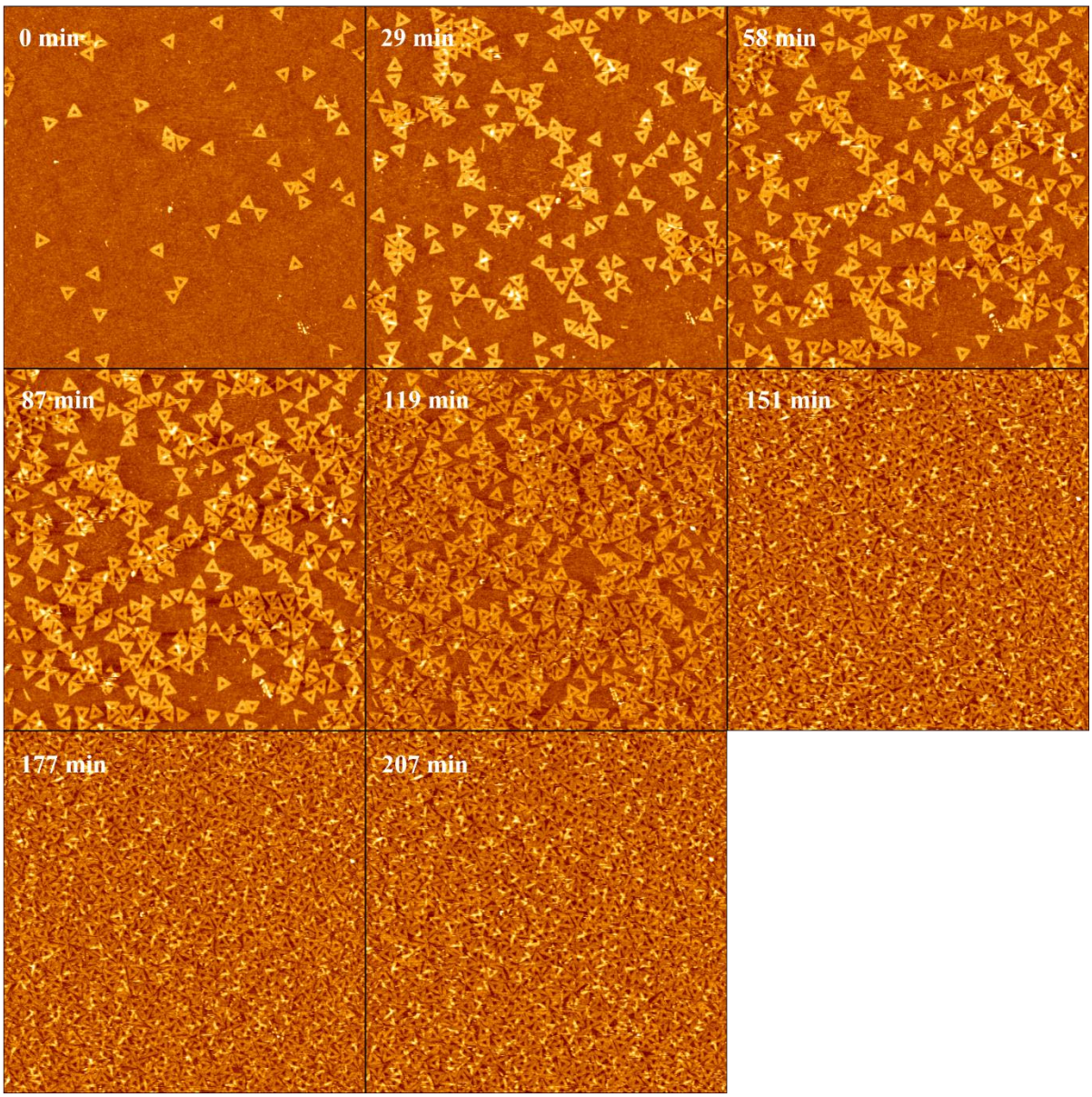

Figure S3: Time-lapse AFM images of DNA origami triangles on a SiO_2 surface in the presence of 12.5 mM $MgCl_2$ and 400 mM NaCl at 20°C.

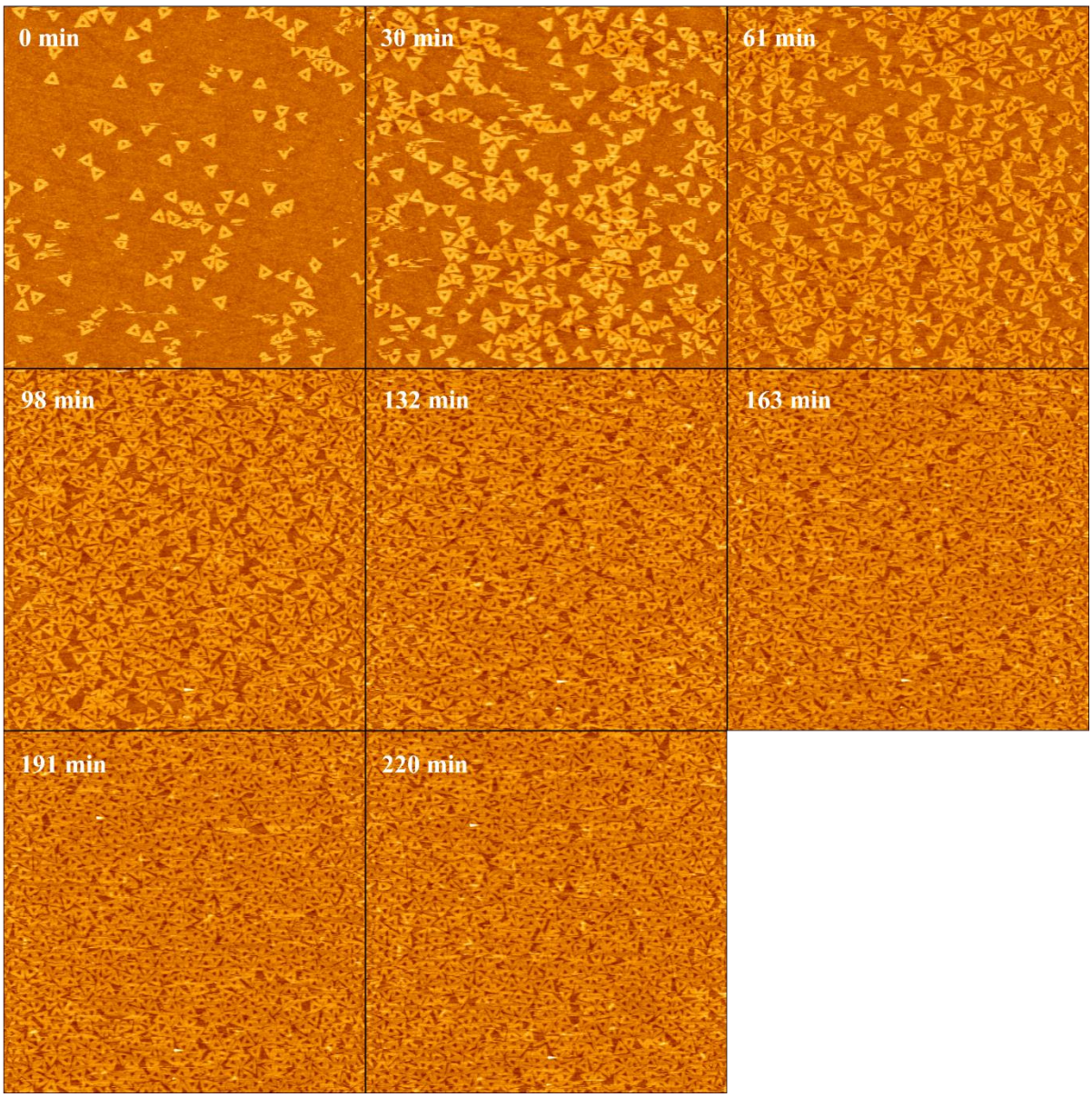

Figure S4: Time-lapse AFM images of DNA origami triangles on a SiO_2 surface in the presence of 12.5 mM $CaCl_2$ and 400 mM NaCl at 20°C.

Figure S5: Time-lapse AFM images of DNA origami triangles on a SiO_2 surface in the presence of 12.5 mM $MgCl_2$ and 600 mM NaCl at 20°C.

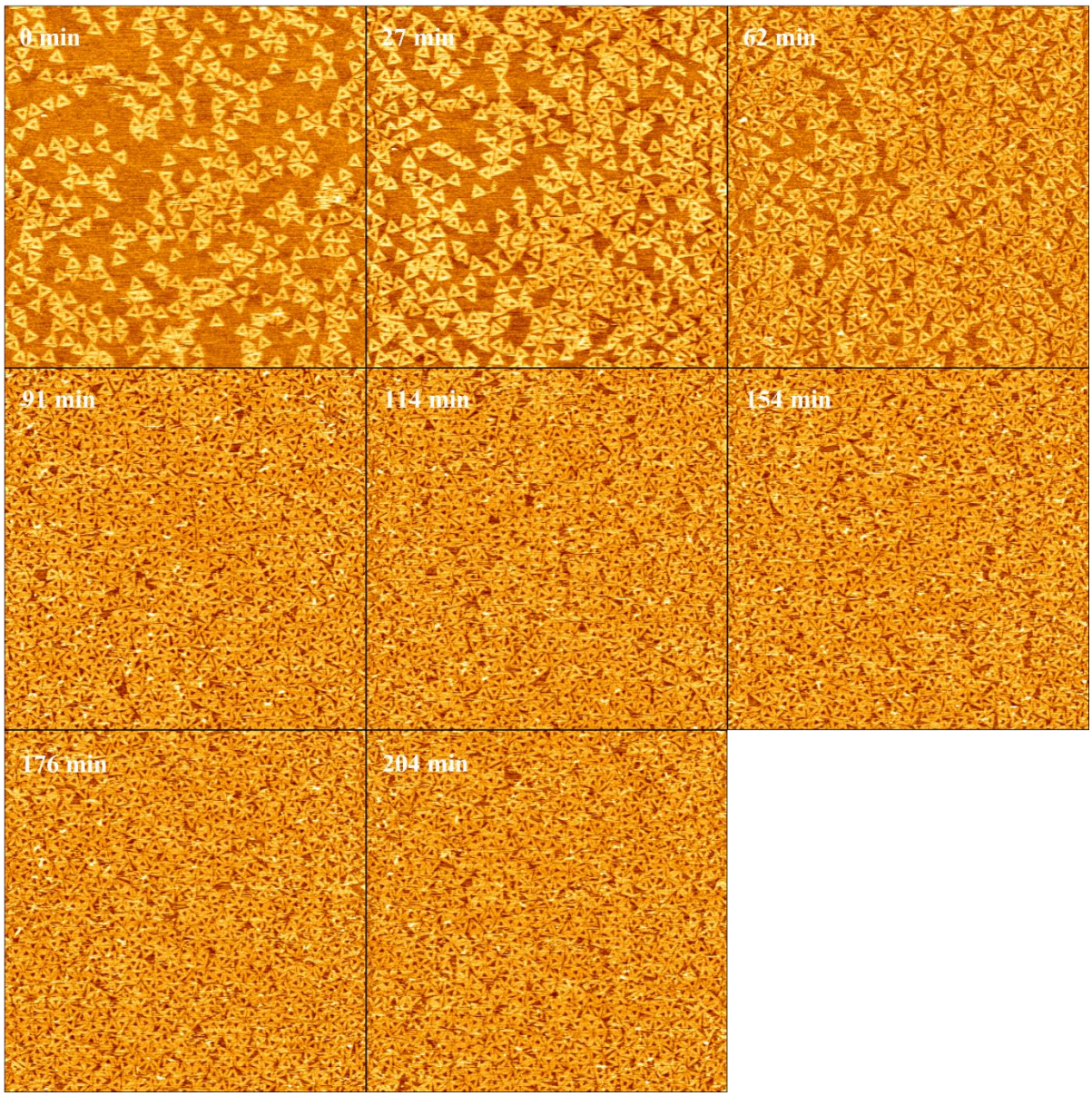

Figure S6: Time-lapse AFM images of DNA origami triangles on a SiO_2 surface in the presence of 12.5 mM $CaCl_2$ and 600 mM NaCl at 20°C.

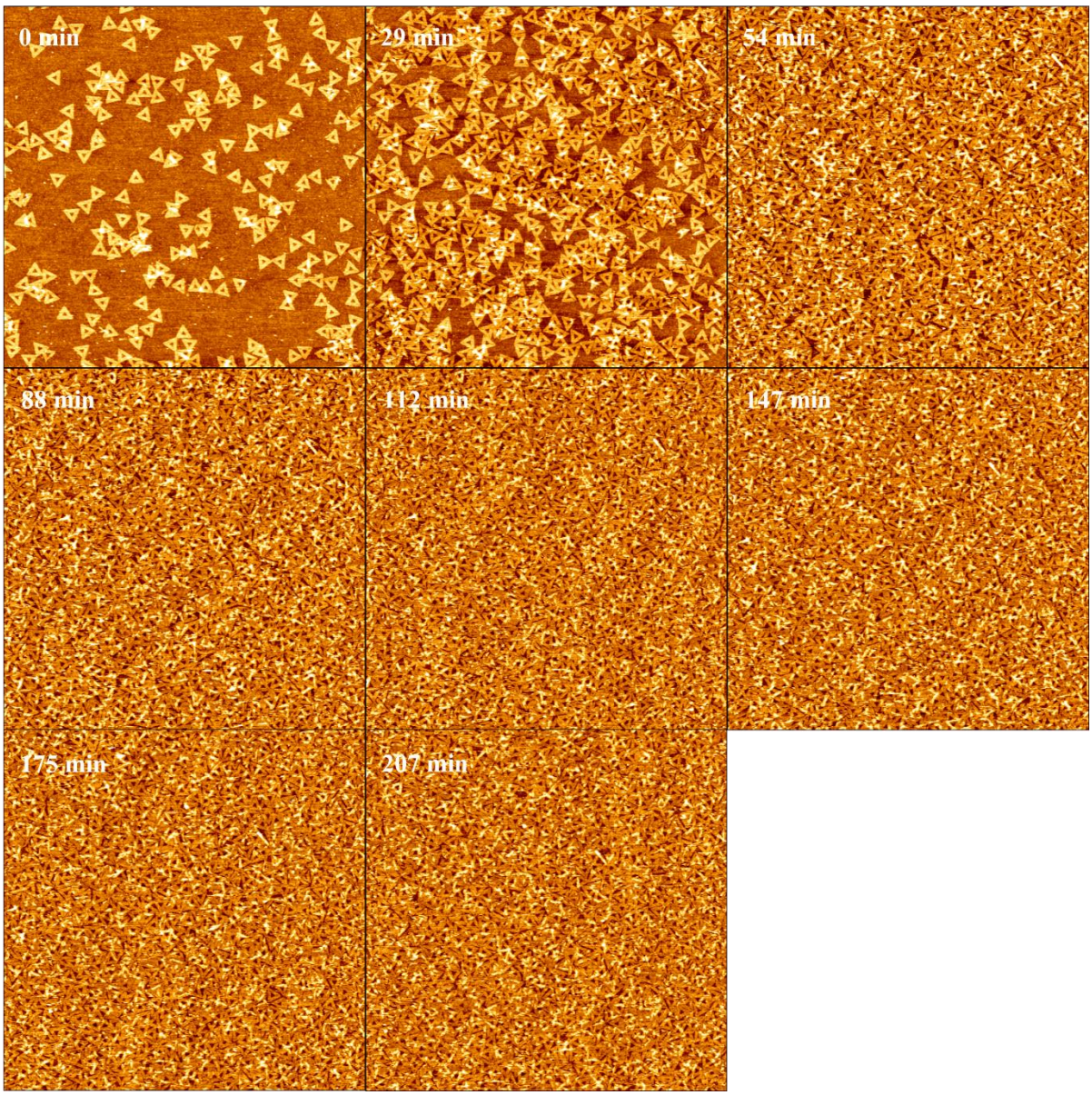

Figure S7: Time-lapse AFM images of DNA origami triangles on a SiO_2 surface in the presence of 12.5 mM $MgCl_2$ and 200 mM NaCl at 30°C.

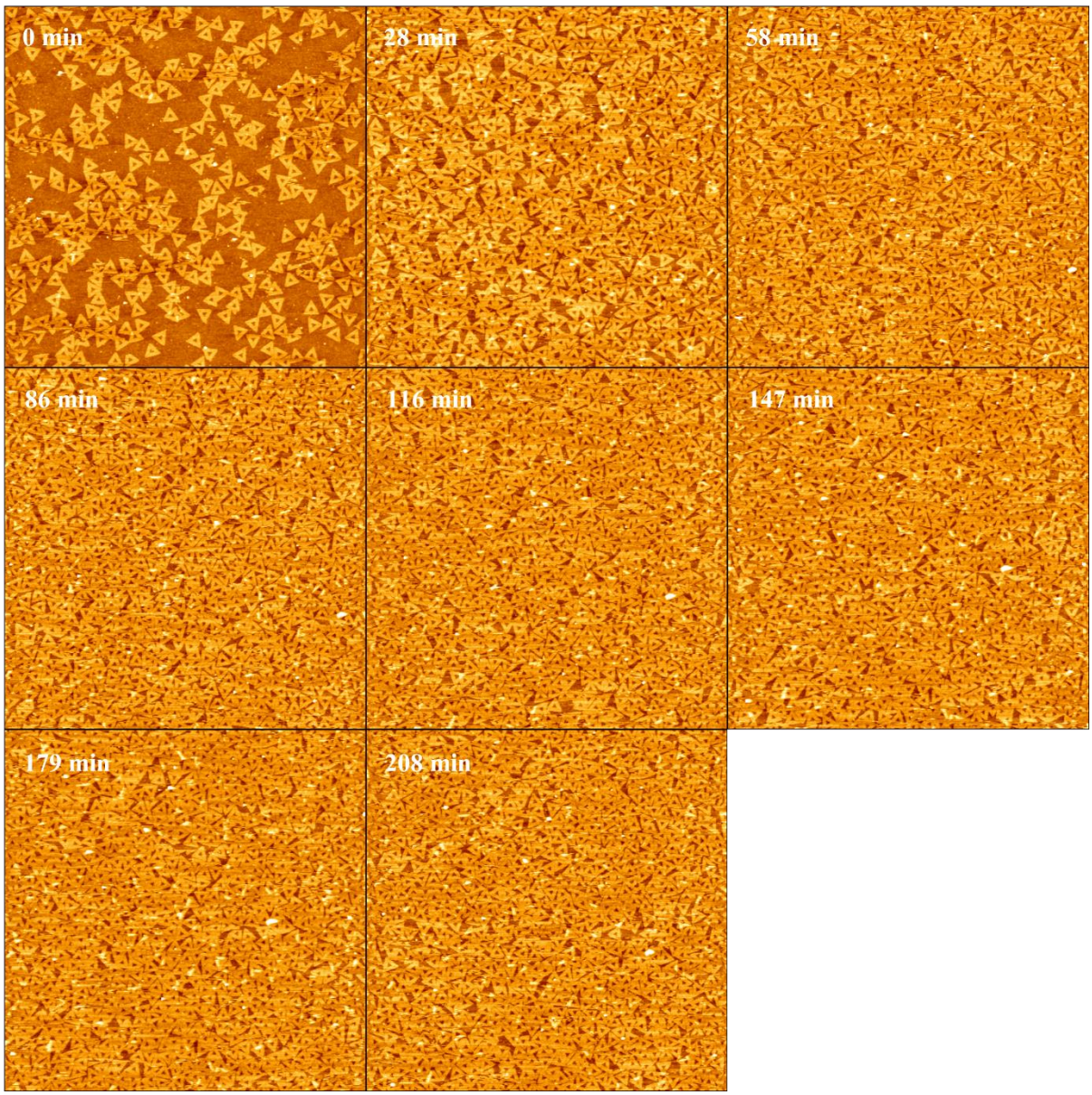

Figure S8: Time-lapse AFM images of DNA origami triangles on a SiO_2 surface in the presence of 12.5 mM $CaCl_2$ and 200 mM NaCl at 30°C.

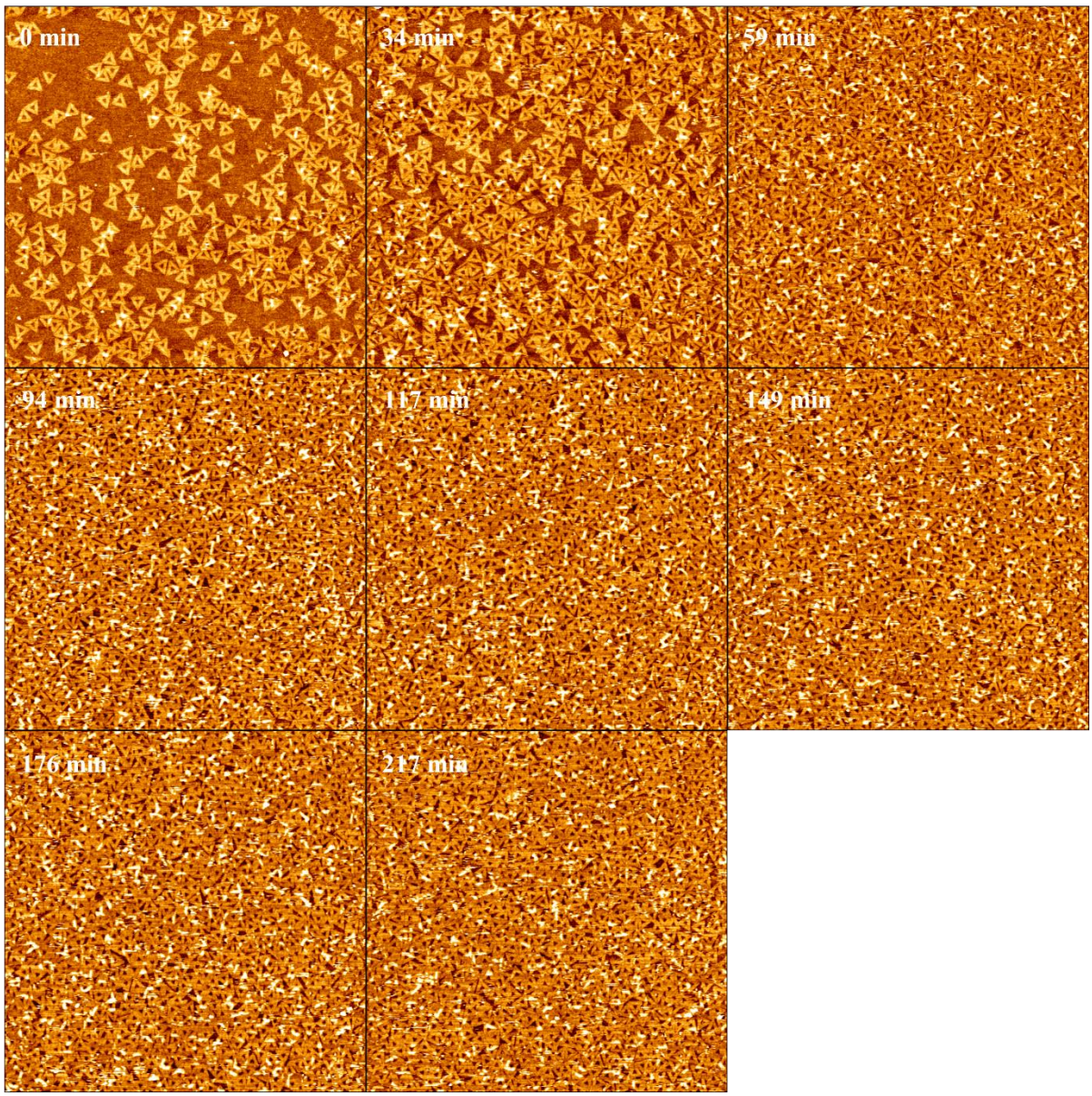

Figure S9: Time-lapse AFM images of DNA origami triangles on a SiO_2 surface in the presence of 12.5 mM $MgCl_2$ and 400 mM NaCl at 30°C.

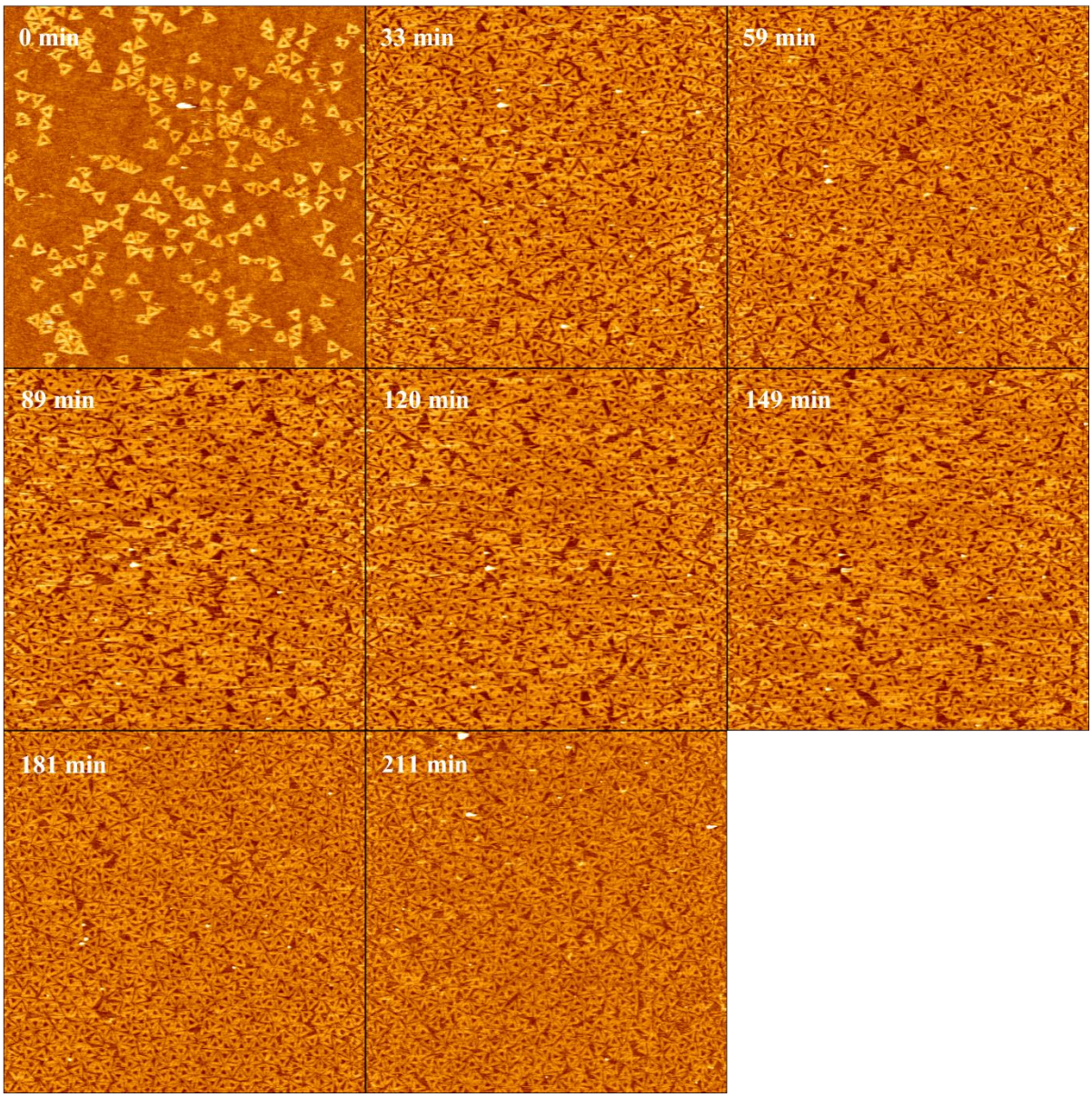

Figure S10: Time-lapse AFM images of DNA origami triangles on a SiO_2 surface in the presence of 12.5 mM $CaCl_2$ and 400 mM NaCl at 30°C.

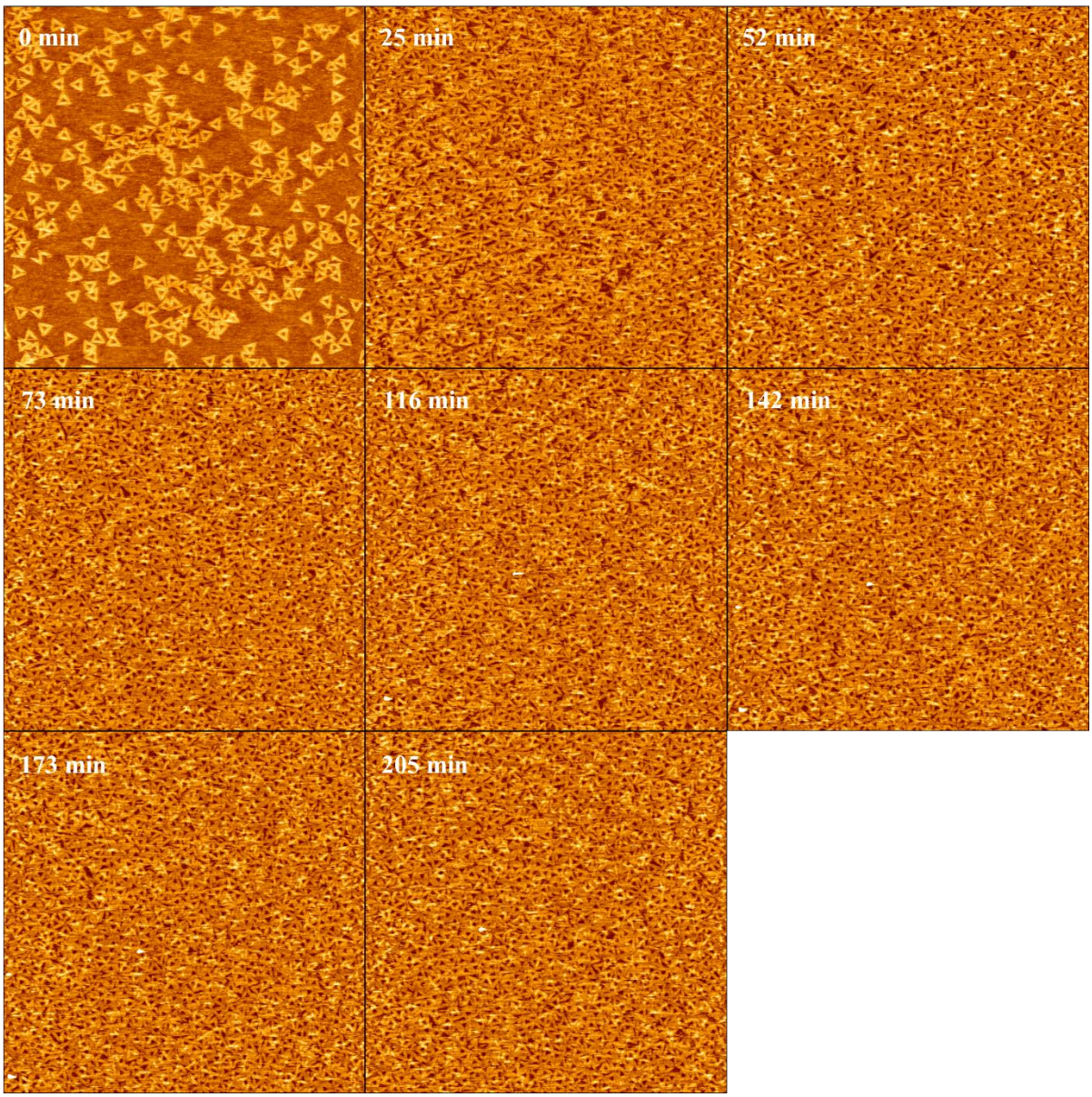

Figure S11: Time-lapse AFM images of DNA origami triangles on a SiO_2 surface in the presence of 12.5 mM $MgCl_2$ and 600 mM NaCl at 30°C.

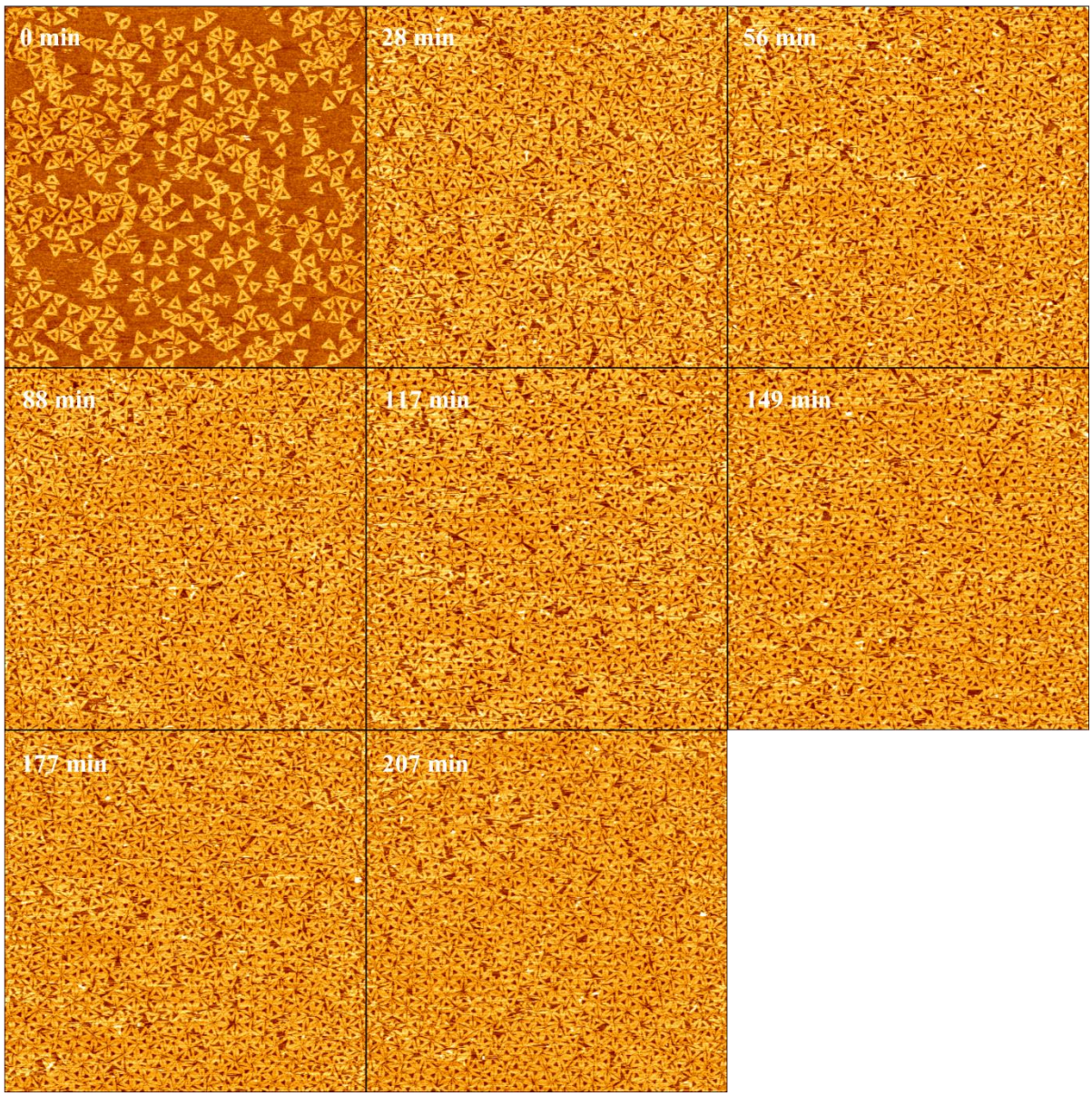

Figure S12: Time-lapse AFM images of DNA origami triangles on a SiO_2 surface in the presence of 12.5 mM $CaCl_2$ and 600 mM NaCl at 30°C.

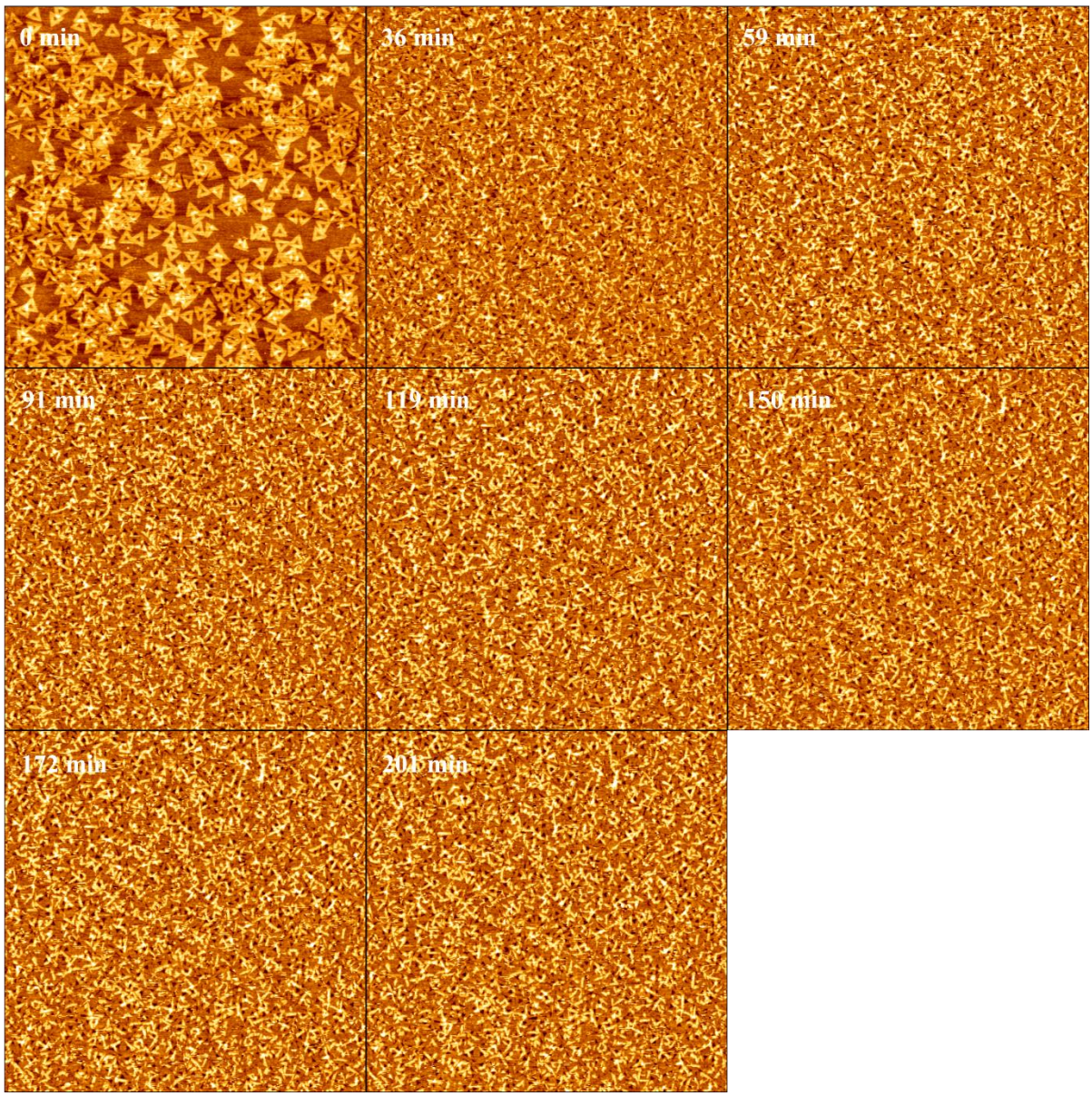

Figure S13: Time-lapse AFM images of DNA origami triangles on a SiO_2 surface in the presence of 12.5 mM $MgCl_2$ and 200 mM NaCl at 40°C.

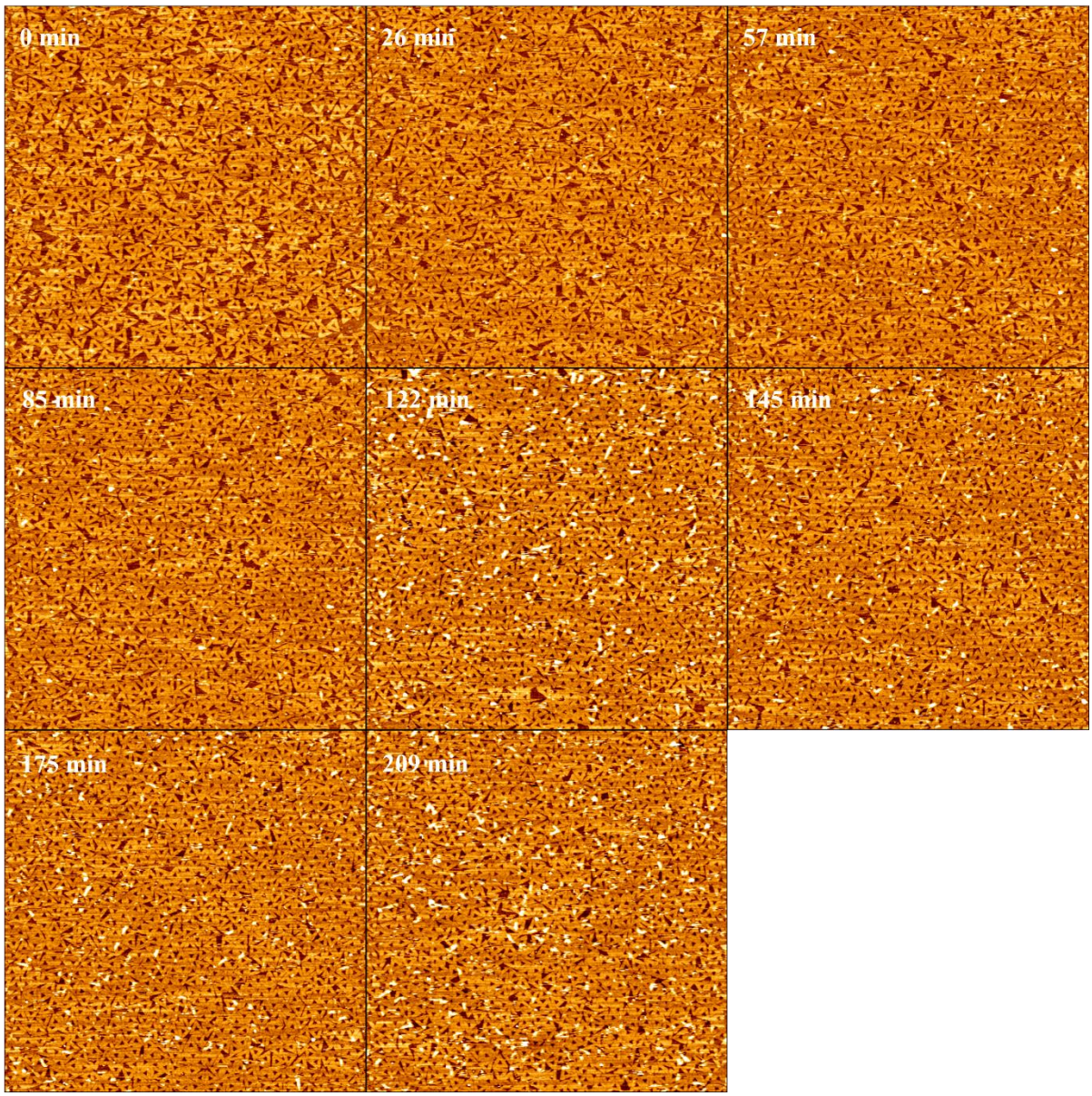

Figure S14: Time-lapse AFM images of DNA origami triangles on a SiO_2 surface in the presence of 12.5 mM $CaCl_2$ and 200 mM NaCl at 40°C.

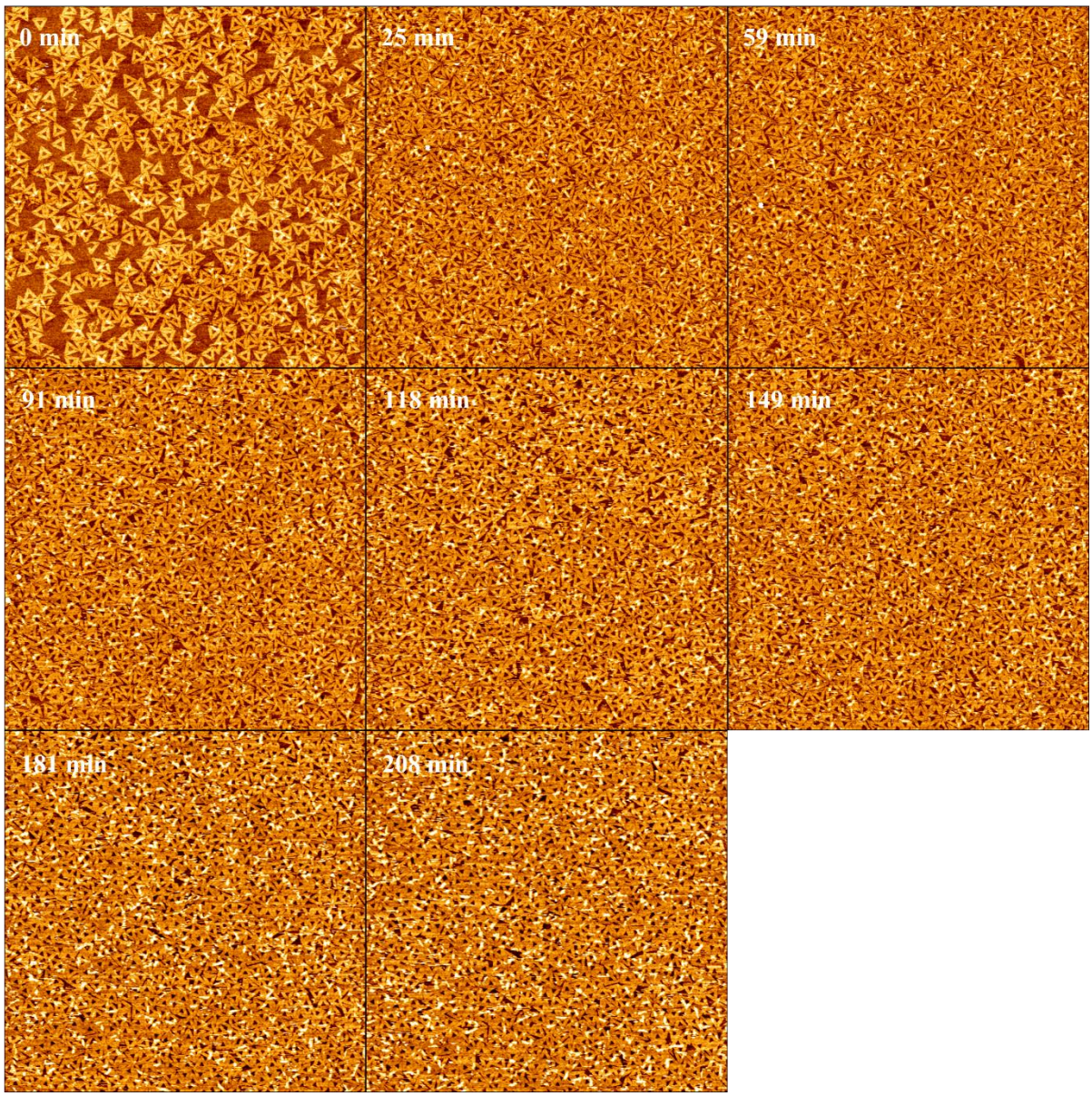

Figure S15: Time-lapse AFM images of DNA origami triangles on a SiO_2 surface in the presence of 12.5 mM $MgCl_2$ and 400 mM NaCl at 40°C.

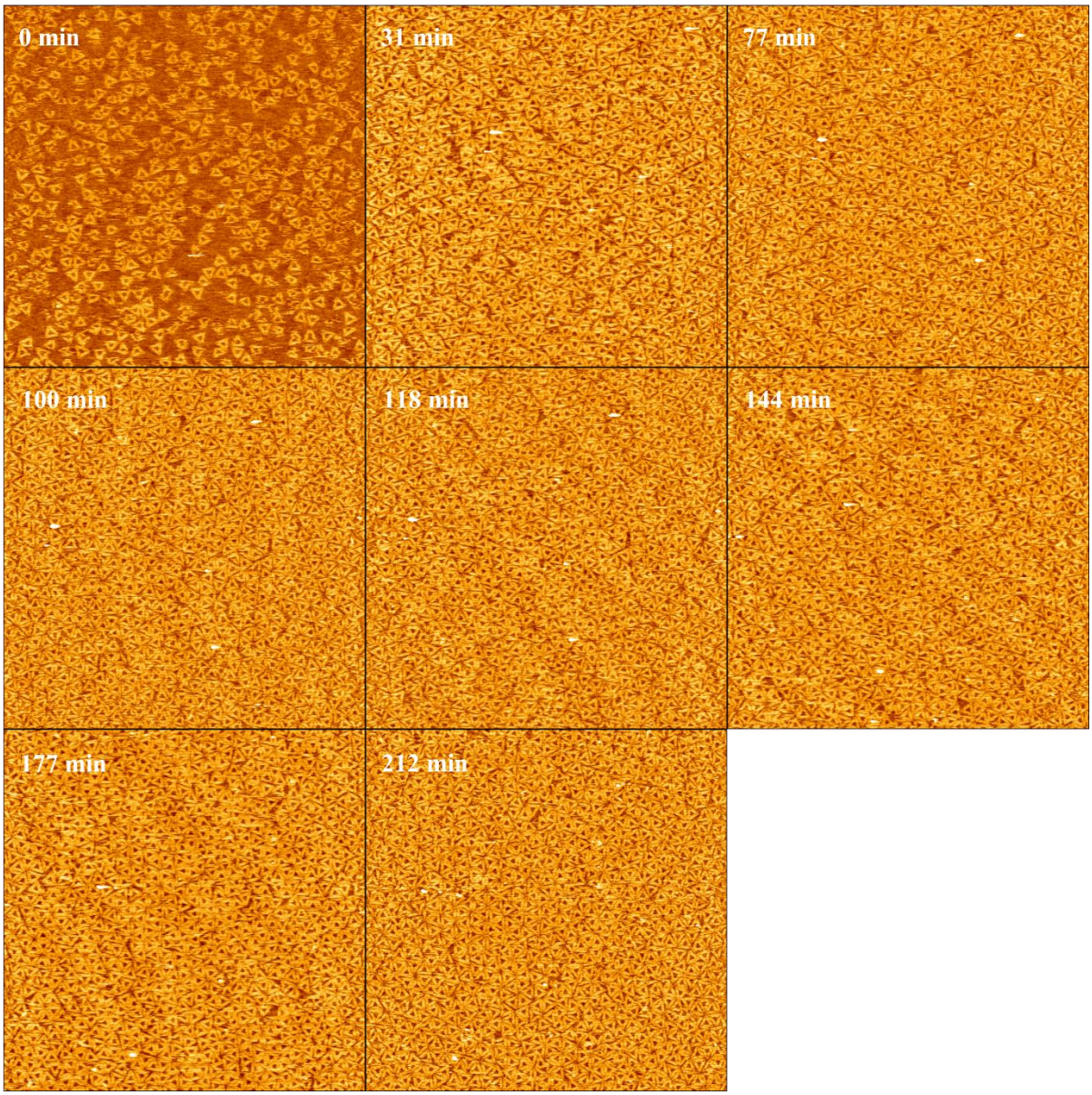

Figure S16: Time-lapse AFM images of DNA origami triangles on a SiO_2 surface in the presence of 12.5 mM $CaCl_2$ and 400 mM NaCl at 40°C.

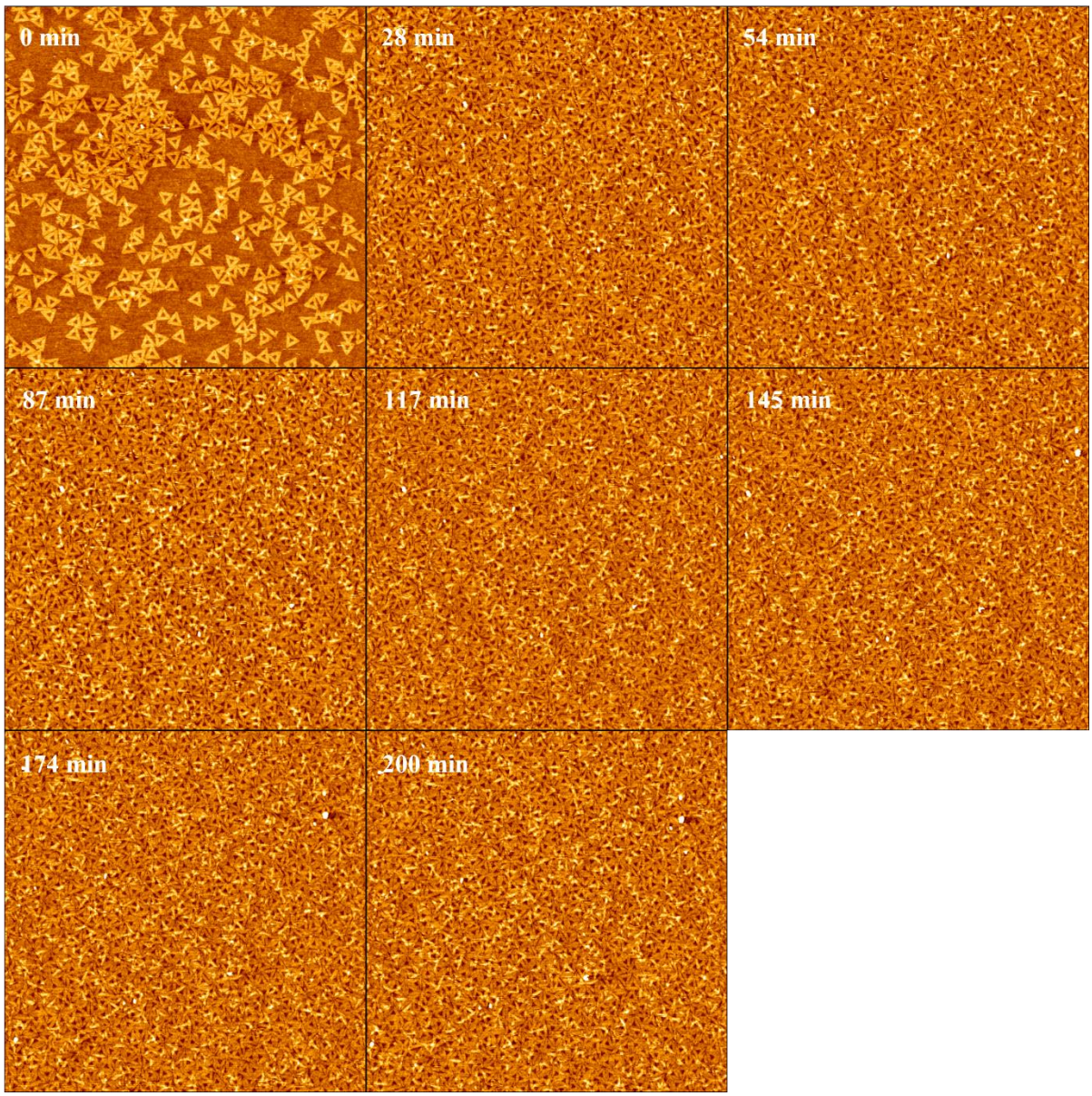

Figure S17: Time-lapse AFM images of DNA origami triangles on a SiO_2 surface in the presence of 12.5 mM $MgCl_2$ and 600 mM NaCl at 40°C.

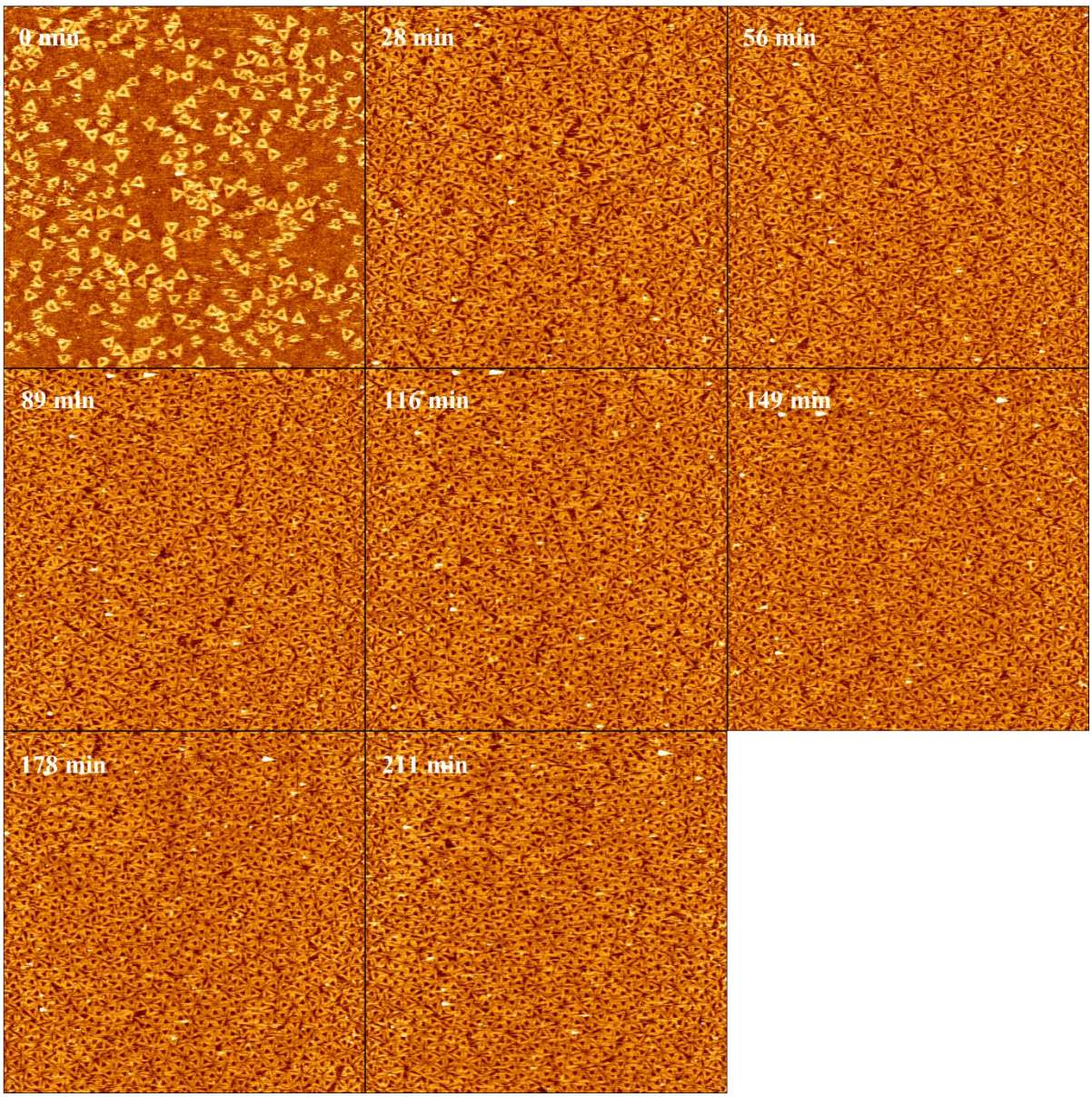

Figure S18: Time-lapse AFM images of DNA origami triangles on a SiO_2 surface in the presence of 12.5 mM $CaCl_2$ and 600 mM NaCl at 40°C.

Determination of surface coverage

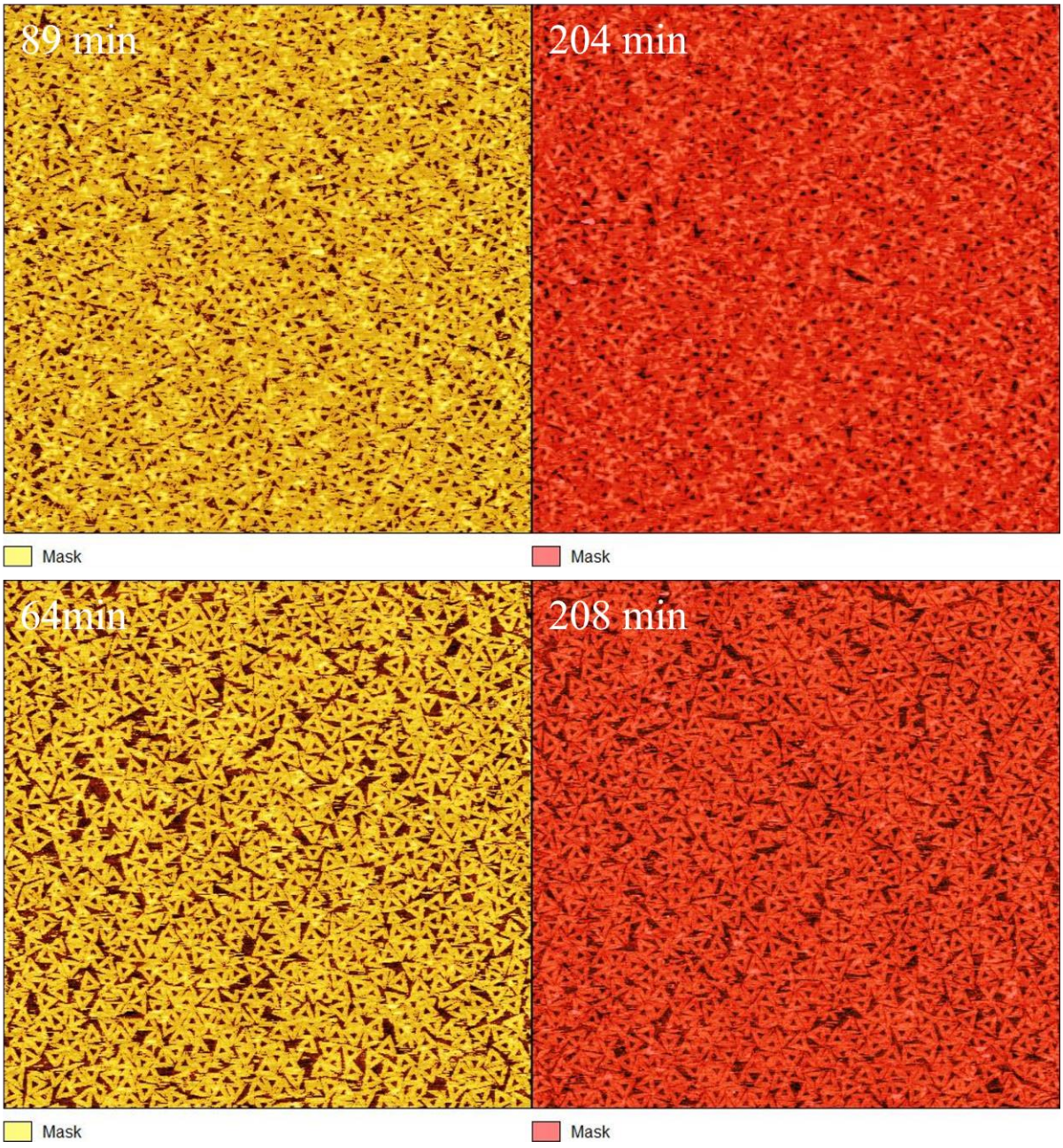

Figure S19: Masked AFM images of DNA origami lattices assembled at 20 °C in the presence of 200 mM NaCl and 12.5 mM $MgCl_2$ (top) or $CaCl_2$ (bottom). The images on the left and right show the lattices upon formation of a closed monolayer (time T1, yellow) and at the end of incubation (time T2, red), respectively.

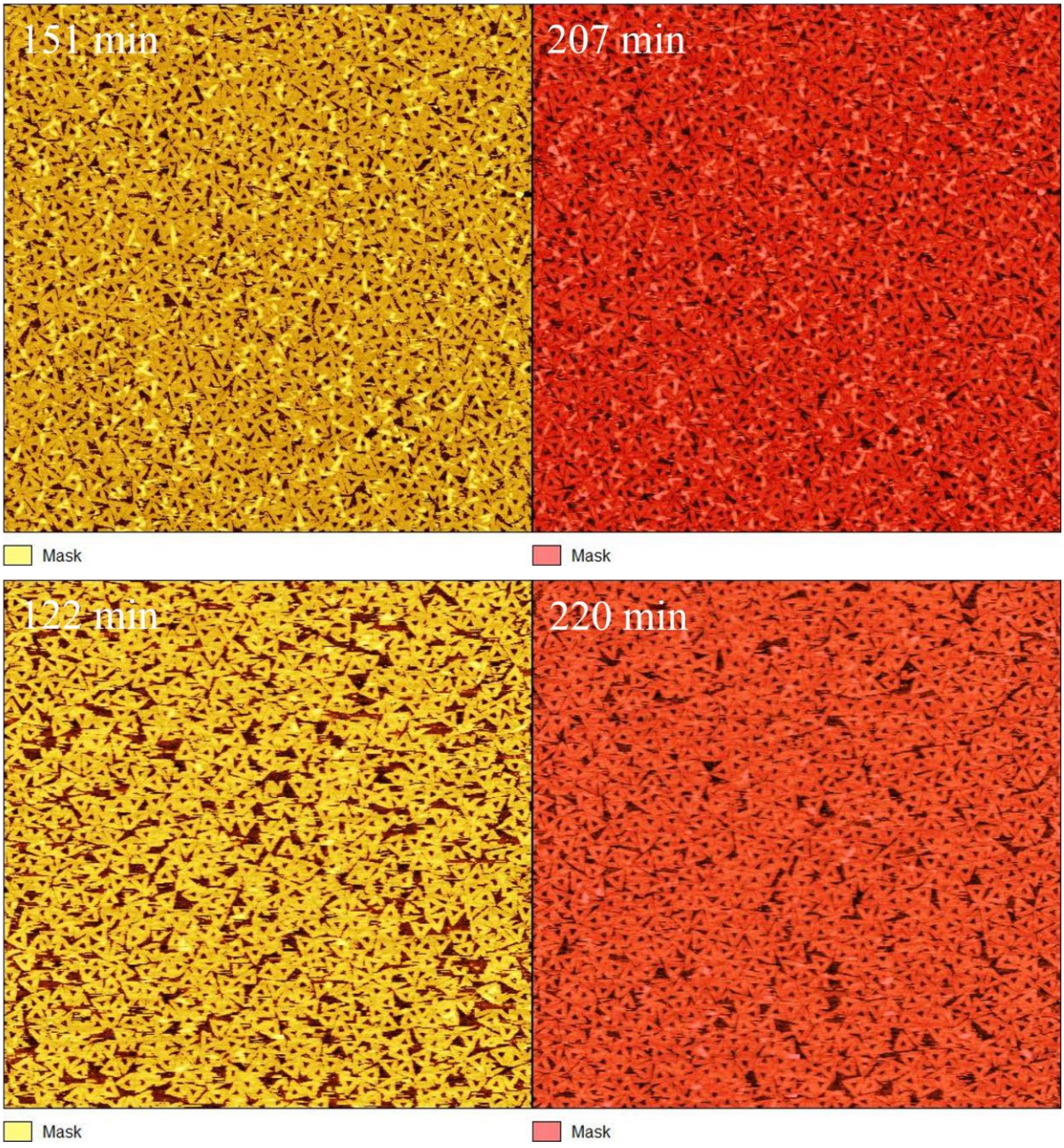

Figure S20: Masked AFM images of DNA origami lattices assembled at 20 °C in the presence of 400 mM NaCl and 12.5 mM $MgCl_2$ (top) or $CaCl_2$ (bottom). The images on the left and right show the lattices upon formation of a closed monolayer (time T1, yellow) and at the end of incubation (time T2, red), respectively.

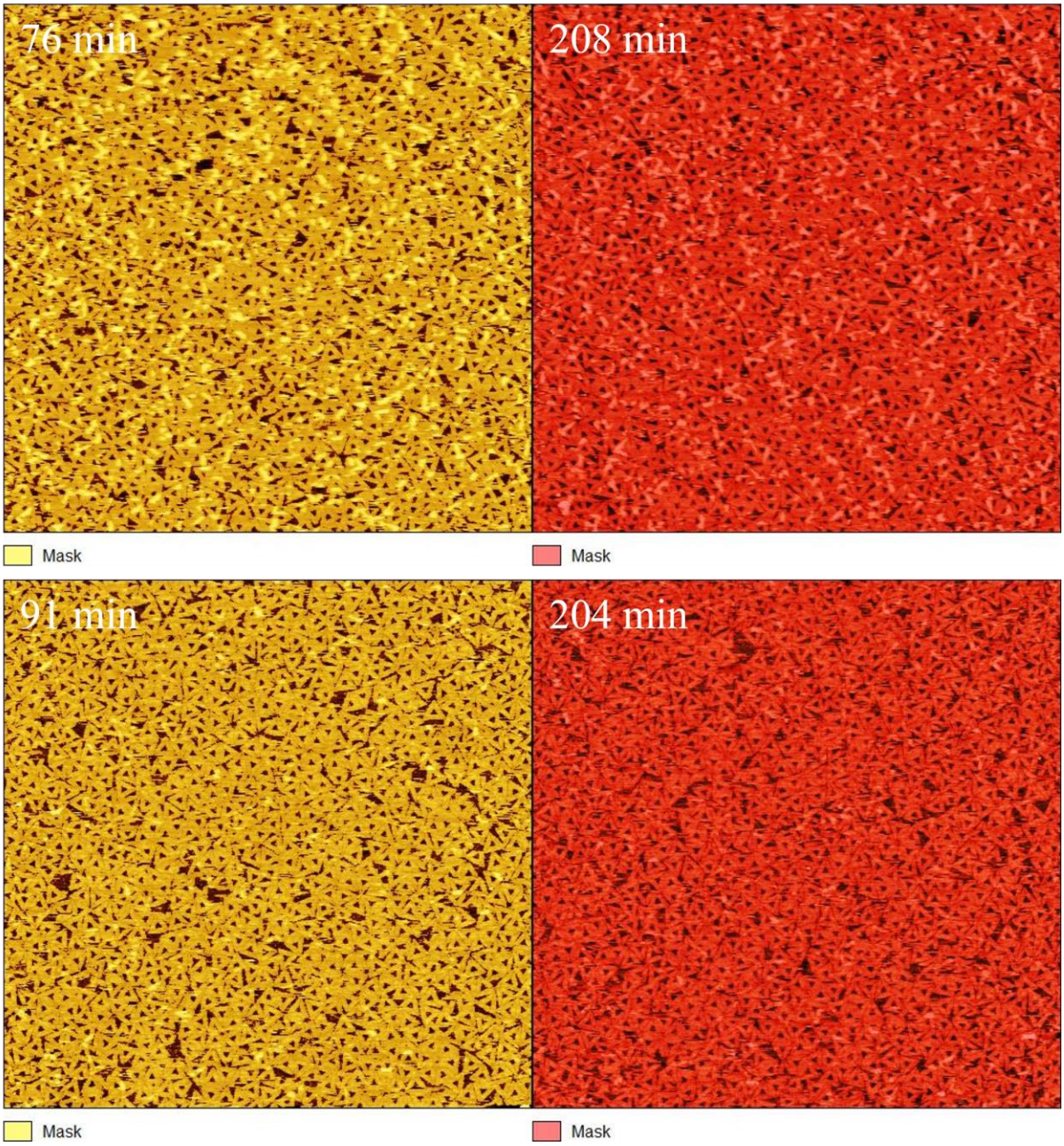

Figure S21: Masked AFM images of DNA origami lattices assembled at 20 °C in the presence of 600 mM NaCl and 12.5 mM $MgCl_2$ (top) or $CaCl_2$ (bottom). The images on the left and right show the lattices upon formation of a closed monolayer (time T1, yellow) and at the end of incubation (time T2, red), respectively.

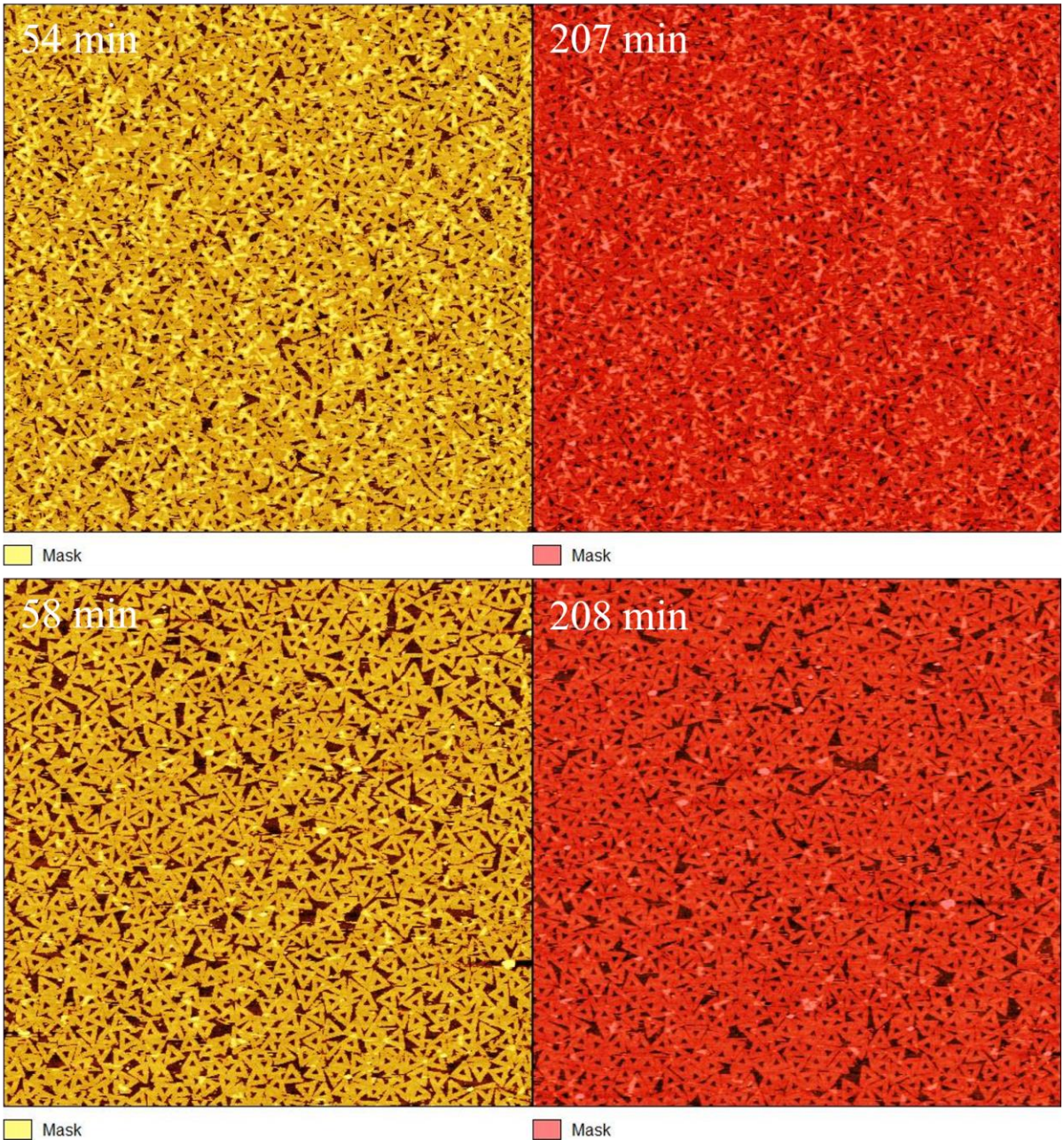

Figure S22: Masked AFM images of DNA origami lattices assembled at 30 °C in the presence of 200 mM NaCl and 12.5 mM $MgCl_2$ (top) or $CaCl_2$ (bottom). The images on the left and right show the lattices upon formation of a closed monolayer (time T1, yellow) and at the end of incubation (time T2, red), respectively.

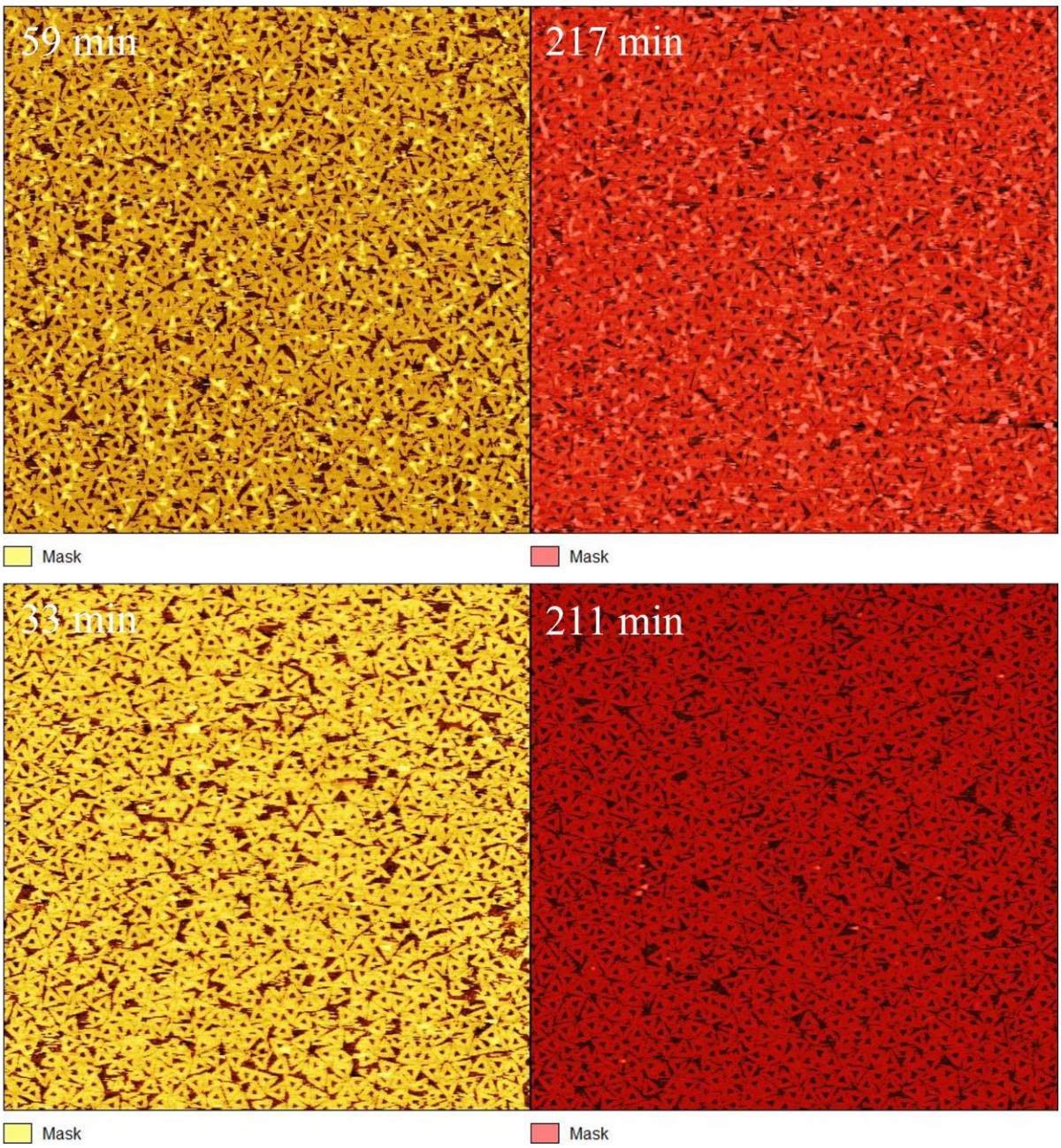

Figure S23: Masked AFM images of DNA origami lattices assembled at 30 °C in the presence of 400 mM NaCl and 12.5 mM $MgCl_2$ (top) or $CaCl_2$ (bottom). The images on the left and right show the lattices upon formation of a closed monolayer (time T1, yellow) and at the end of incubation (time T2, red), respectively.

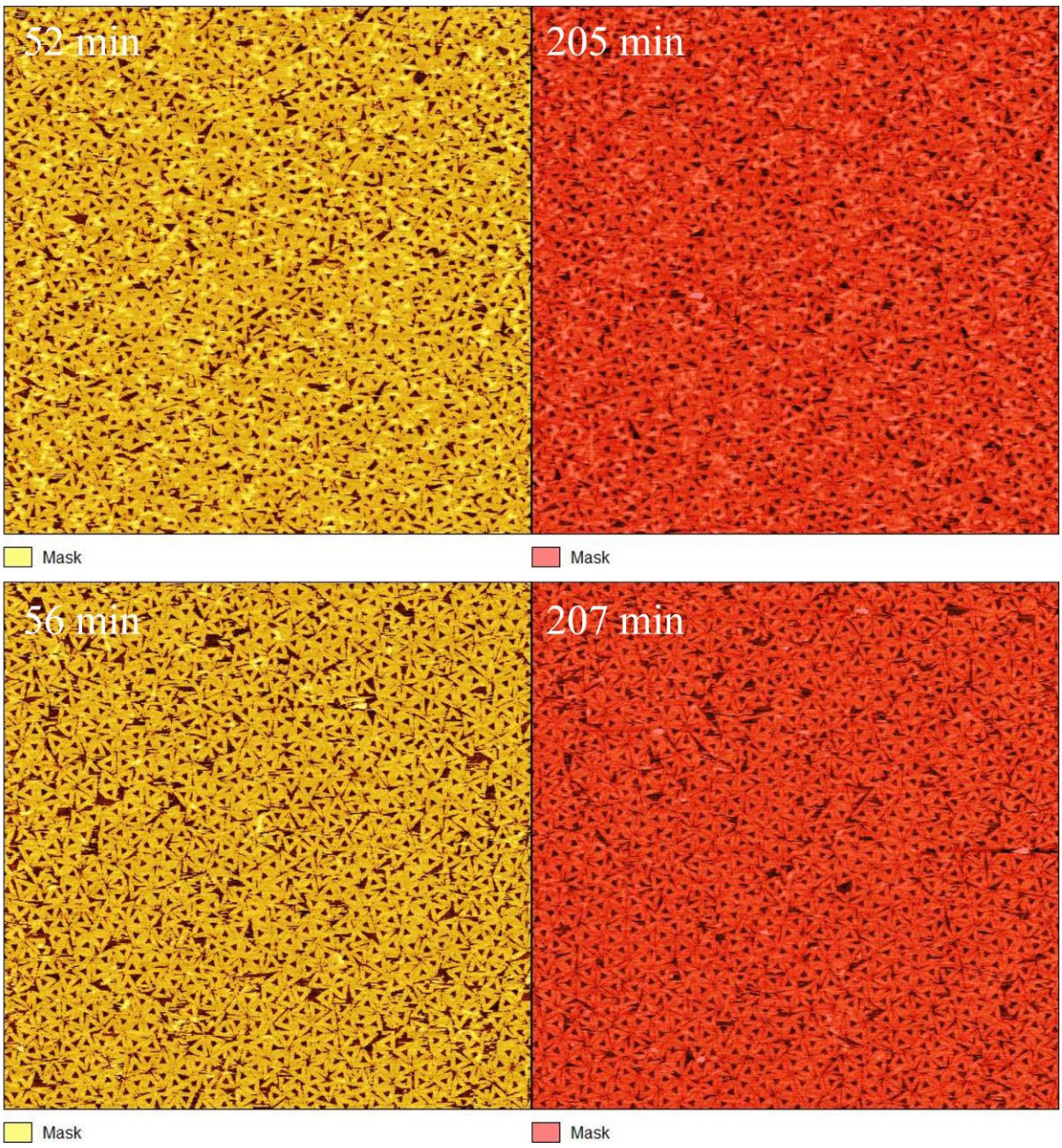

Figure S24: Masked AFM images of DNA origami lattices assembled at 30 °C in the presence of 600 mM NaCl and 12.5 mM $MgCl_2$ (top) or $CaCl_2$ (bottom). The images on the left and right show the lattices upon formation of a closed monolayer (time T1, yellow) and at the end of incubation (time T2, red), respectively.

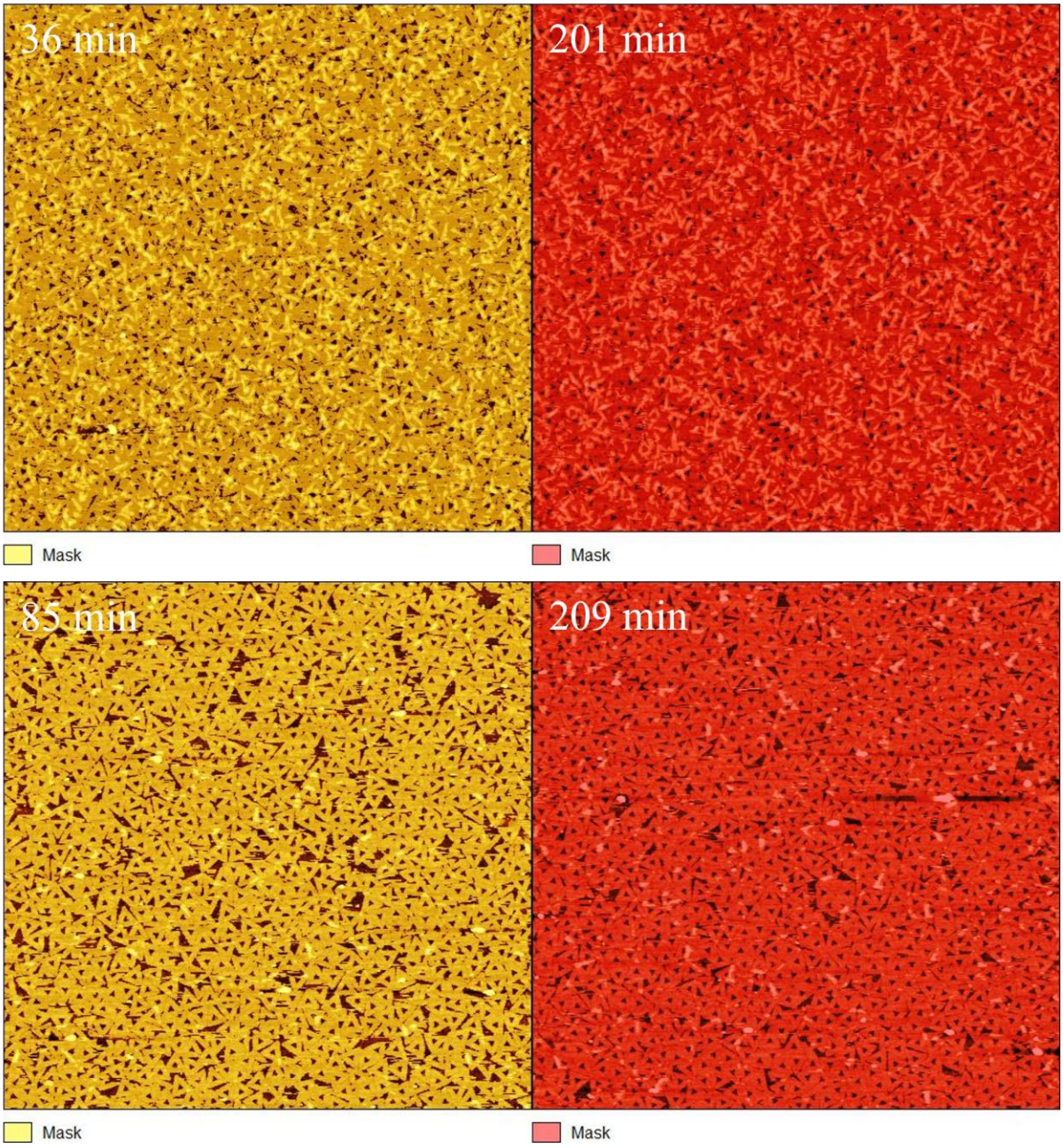

Figure S25: Masked AFM images of DNA origami lattices assembled at 40 °C in the presence of 200 mM NaCl and 12.5 mM $MgCl_2$ (top) or $CaCl_2$ (bottom). The images on the left and right show the lattices upon formation of a closed monolayer (time T1, yellow) and at the end of incubation (time T2, red), respectively.

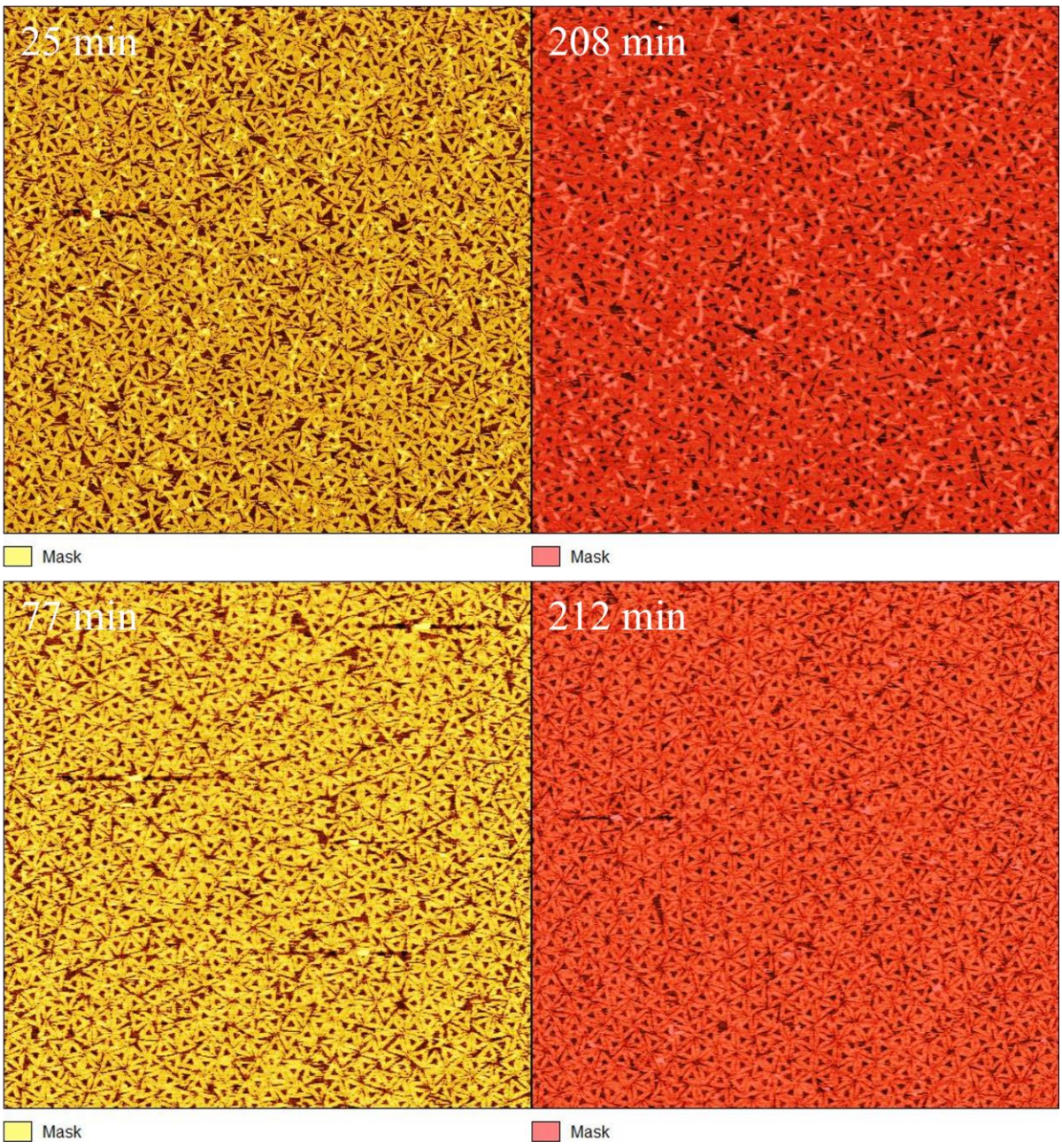

Figure S26: Masked AFM images of DNA origami lattices assembled at 40 °C in the presence of 400 mM NaCl and 12.5 mM $MgCl_2$ (top) or $CaCl_2$ (bottom). The images on the left and right show the lattices upon formation of a closed monolayer (time T1, yellow) and at the end of incubation (time T2, red), respectively.

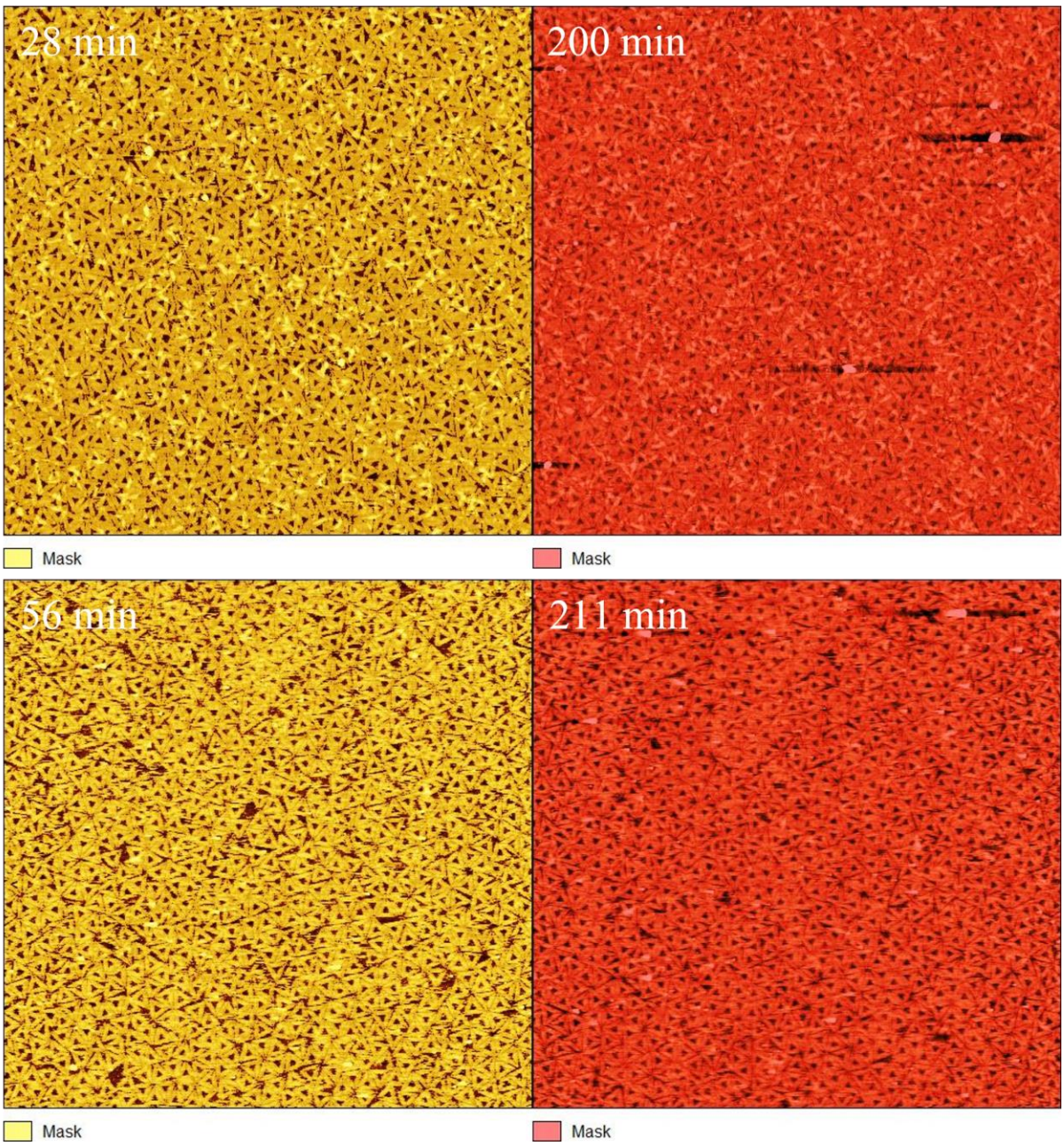

Figure S27: Masked AFM images of DNA origami lattices assembled at 40 °C in the presence of 600 mM NaCl and 12.5 mM $MgCl_2$ (top) or $CaCl_2$ (bottom). The images on the left and right show the lattices upon formation of a closed monolayer (time T1, yellow) and at the end of incubation (time T2, red), respectively.

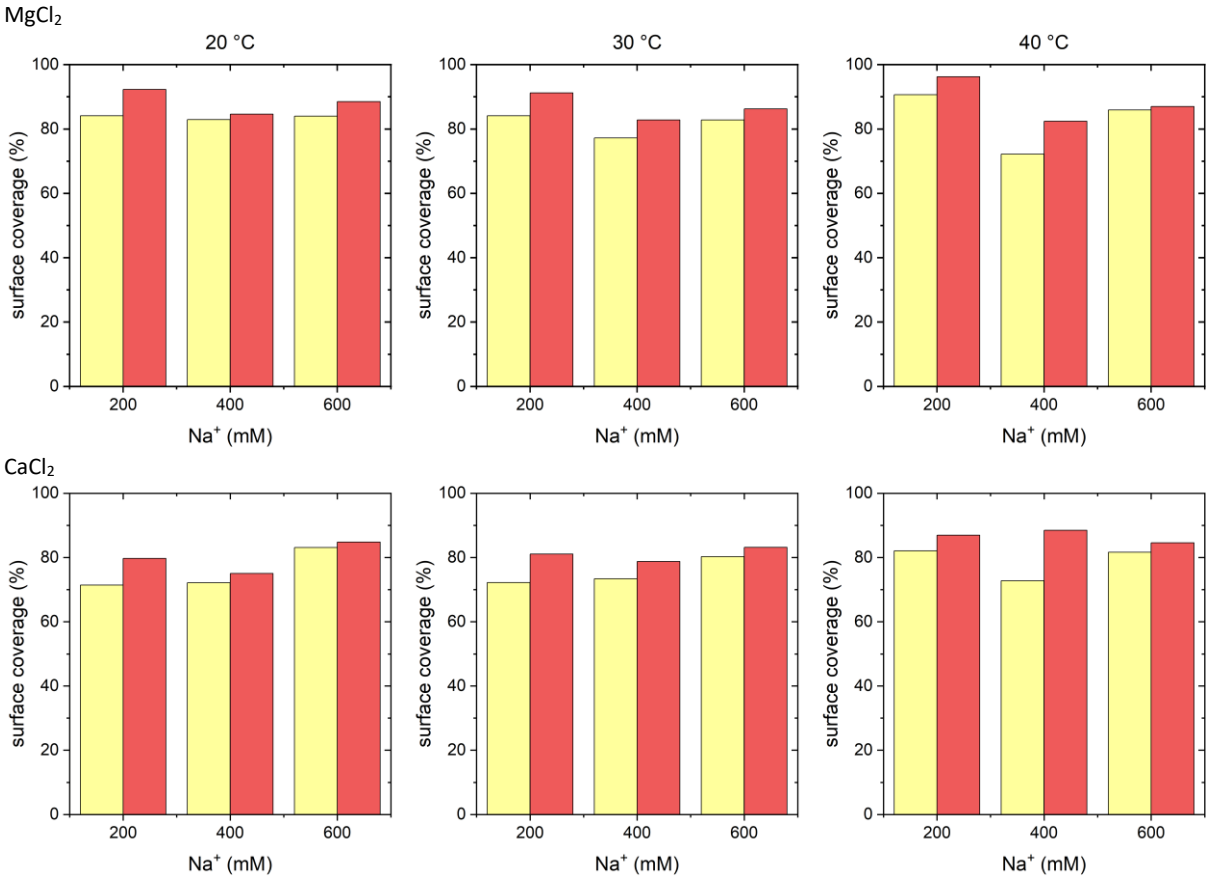

Figure S28: Determined surface coverage for 12.5 mM $MgCl_2$ (top) or $CaCl_2$ (bottom). The images on the left and right show the lattices upon formation of a closed monolayer (time T1, yellow) and at the end of incubation (time T2, red), respectively.

Transfer into the dry state

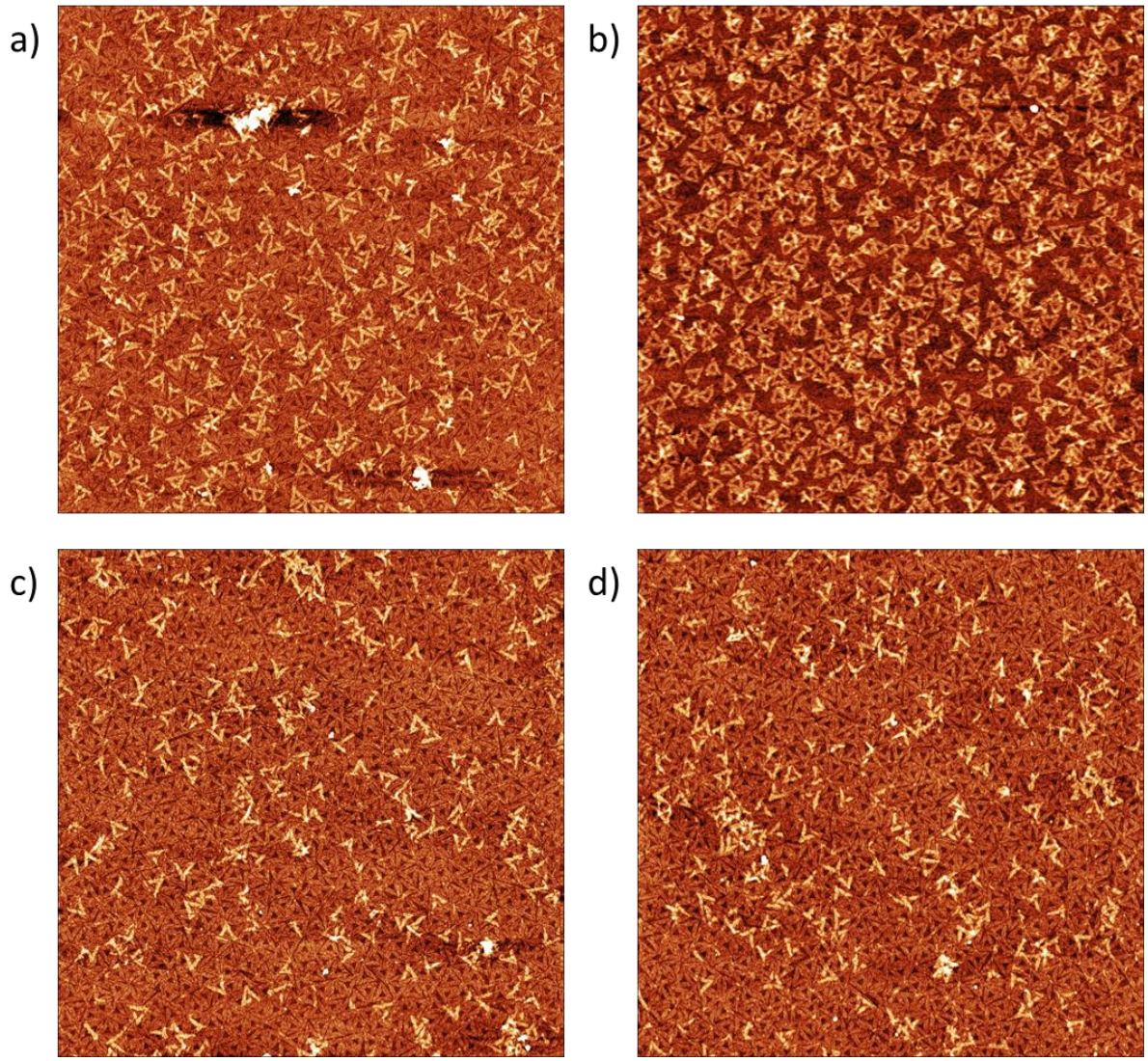

Figure S29: AFM images (3 x 3 µm²) of DNA origami lattices assembled on SiO_2 surfaces at 40 °C in the presence of 400 mM NaCl and 12.5 mM $CaCl_2$ after transfer into the dry state. a) After lattice assembly, $NiCl_2$ solution was added directly to the DNA origami-containing solution on top of the substrate surface. b) After lattice assembly, the sample was first cooled to 4 °C and the DNA origami-containing solution was removed with a pipette. The $NiCl_2$ solution was then added immediately to the still moist substrate surface. c,d) After lattice assembly, the sample was cooled to 4 °C. The $NiCl_2$ solution was then added to the DNA origami-containing solution on top of the substrate surface. The DNA origami concentration was 4 nM (a,b,c) and 3 nM (d), respectively.