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Amplified Self-replication of DNA Origami Nanostructures through Multi-cycle Fast-annealing Process FENG ZHOU, Center for Soft Matter Research, New York University, Department of Physics, New York University, REBECCA ZHUO, Department of Chemistry, New York University, XIAOJIN HE, Center for Soft Matter Research, New York University, Department of Physics, New York University, RUOJIE SHA, Center for Soft Matter Research, New York University, Department of Chemistry, New York University, NADRIAN SEEMAN, Department of Chemistry, New York University, PAUL CHAIKIN, Center for Soft Matter Research, New York University, Department of Physics, New York University — We have developed a non-biological self-replication process using templated reversible association of components and irreversible linking with annealing and UV cycles. The current method requires a long annealing time, up to several days, to achieve the specific self-assembly of DNA nanostructures. In this work, we accomplished the self-replication with a shorter time and smaller replication rate per cycle. By decreasing the ramping time, we obtained the comparable replication yield within 90 min. Systematic studies show that the temperature and annealing time play essential roles in the self-replication process. In this manner, we can amplify the self-replication process to a factor of 20 by increasing the number of cycles within the same amount of time.

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