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Ligation of Complementary Oligomers in Liquid Crystals of nanoDNA[1] GREGORY SMITH, DAVID WALBA, NOEL CLARK, LCMRC, CU Boulder, WEIXIAN XI, TAO GONG, CHRISTOPHER BOWMAN, Chemical Engineering, CU Boulder, TOMMASO FRACCIA, GIULIANO ZANCHETTA, TOMMASO BELLINI, University of Milan, LIQUID CRYSTAL MATERIALS RESEARCH CENTER, UNIVERSITY OF COLORADO, BOULDER COLLABORATION, DEPARTMENT OF CHEMICAL AND BIOLOGICAL ENGINEERING, UNIVERSITY OF COLORADO, BOULDER COLLABORATION, DIPARTMENTO DI CHIMICA, BIOCHIMICA E BIOTECNOLOGIE, UNIVERSITY OF MILAN, MILAN COLLABORATION — The chromonic stacking mode of short oligomeric DNA upon forming liquid crystalline phases presents an intriguing possibility for liquid crystal autocatalysis, the promotion, by LC ordering, of chemical synthesis that stabilizes LC ordering. In such a scenario the concentration and physical organization of ligation reactants and the fluidity of the liquid crystal phase promotes the appropriate chemical ligation of oligomers. Because it is a mode of elongation free of other catalysts, this offers a tantalizing means of oligonucleotide self-elongation that might have implications in prebiotic life. We present here work toward elucidating possible catalytic enhancement by liquid crystalline phase formation. Ligation approaches based on water soluble carbodiimide base activation and photopolymerization will be presented.

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