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Using DNA-directed crystals to template colloidal clusters JOHN CROCKER, JAMES MCGINLEY, TALID SINNO, University of Pennsylvania — DNA is a versatile tool for directing the controlled self-assembly of nanoscopic and microscopic objects. We demonstrate a new, scalable method for producing highly ordered clusters of sub-micron colloidal microspheres at high yield. The basic idea is first to form a binary AB-type crystal using DNA-directed assembly, where a small fraction of the A species, A', contains a unique DNA sequence not present on the other A species. If the DNA domain of the A' and A particles that drive their interaction with the B species are identical, then the A' co-crystallize stiochiometrically as an 'impurity' into a well ordered AB lattice. Once formed, a soluble DNA strand is added to the crystals which binds the unique A' sequence and selectively stabilizes the A'-B bonds. When the crystals are then melted by heating, every A' particle yields a cluster surrounded by its nearest B neighbors. We will discuss the different clusters we have formed using this approach, as well as limits to yield and ordering in the clusters.

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