

Electronic Supplementary Information

Self-assembly of gold nanorods into vertically aligned, rectangular microplates with a supercrystalline structure

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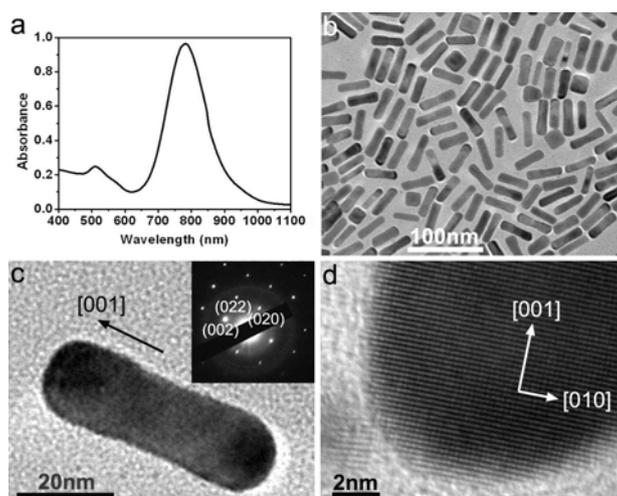


Fig. S1 (a) UV-vis absorption spectrum of aqueous dispersion of GNRs. TEM (b,c) and HRTEM (d) images of GNRs. Inset in (c) shows the related electron diffraction pattern.

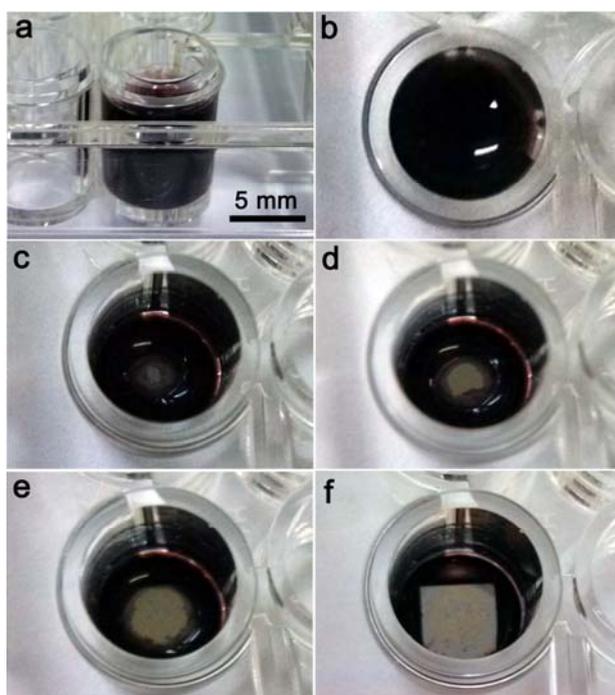


Fig. S2 Photographs of a vessel containing aqueous GNR dispersion and a Si plate lying at the bottom after solvent evaporation for different times: (a,b) 0 h, (c) 72.5 h, (d) 73.5 h, (e) 75 h, (f) 77 h.

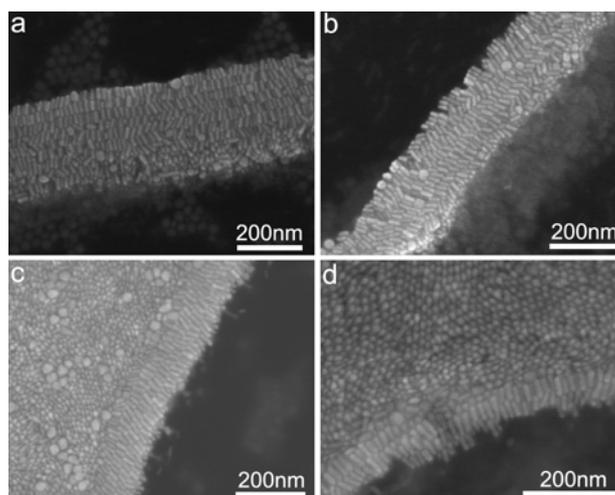


Fig. S3 SEM images of rectangular-plate-shaped supercrystals consisting of different layers of hexagonal close-packed GNR arrays: (a) 7 layers, (b) 6 layers, (c) 3 layers, (d) 2 layers.

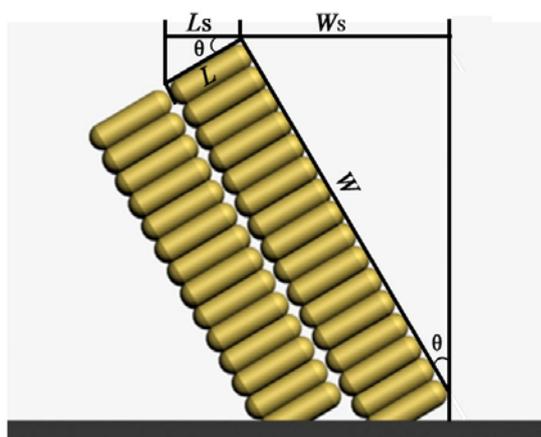


Fig. S4 Schematic illustration of a supercrystalline microplate with a width of W standing on the substrate with an inclination angle of θ , which is assembled by GNRs with a length of L . L_s and W_s denote the apparent GNR length and apparent microplate width obtained from the SEM observation, respectively. The real width (W) of the microplate can be calculated from the measured L_s and W_s values, and the known GNR length ($L \sim 37$ nm) according to the trigonometric ratios.

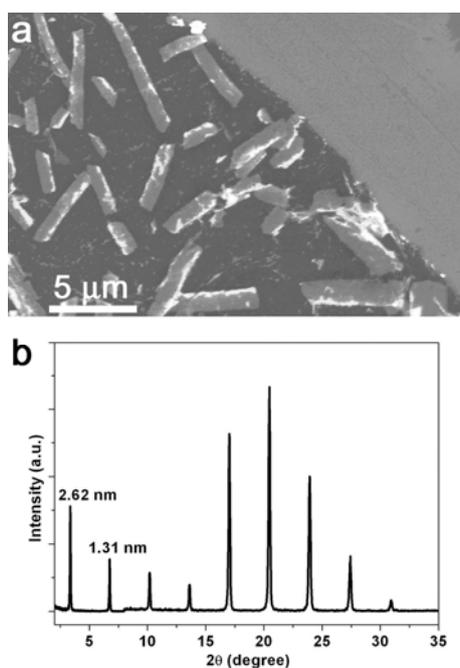


Fig. S5 (a) SEM image of the border region between vertically aligned, supercrystalline microplates standing on the CTAB thin film and the bare Si substrate where the microplates and the thin film were erased manually. (b) XRD pattern of the vertically aligned, supercrystalline microplates, showing the presence of a lamellar structure with a d spacing ~ 2.62 nm, which corresponded to the CTAB thin film.

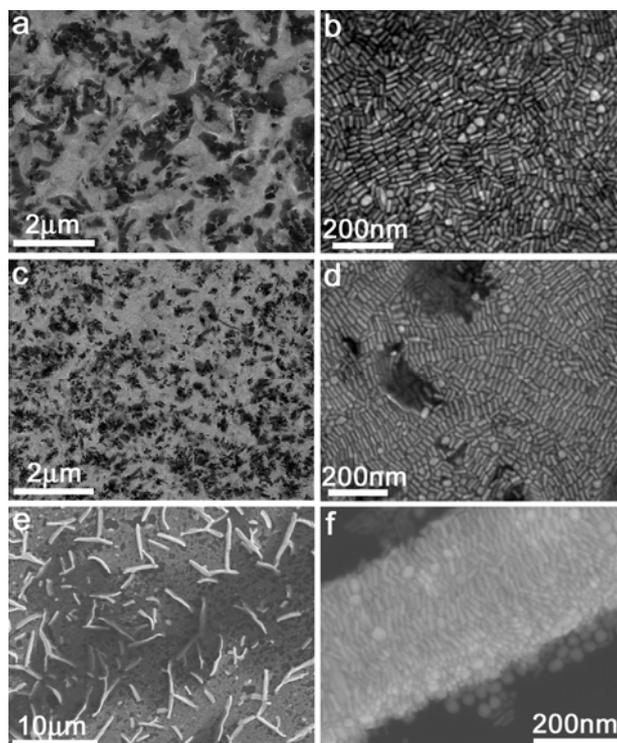


Fig. S6 SEM images of GNR assemblies obtained at different temperatures: (a,b) 65 °C, (c,d) 40 °C, (e,f) 15 °C.

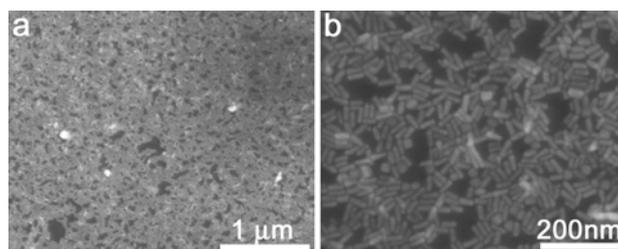


Fig. S7 SEM images of GNR assemblies obtained using a vessel with its inner surface coated with a thin layer of paraffin wax.

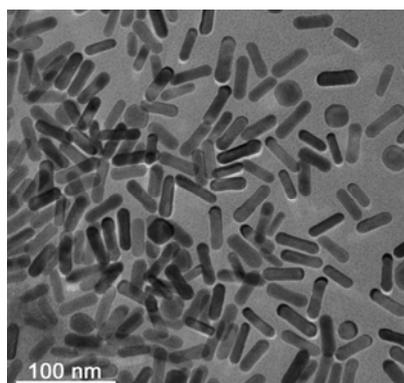


Fig. S8 TEM image of GNRs in the residual solution immediately after the solution covering the Si substrate was completely evaporated, leaving a whole dried Si plate.

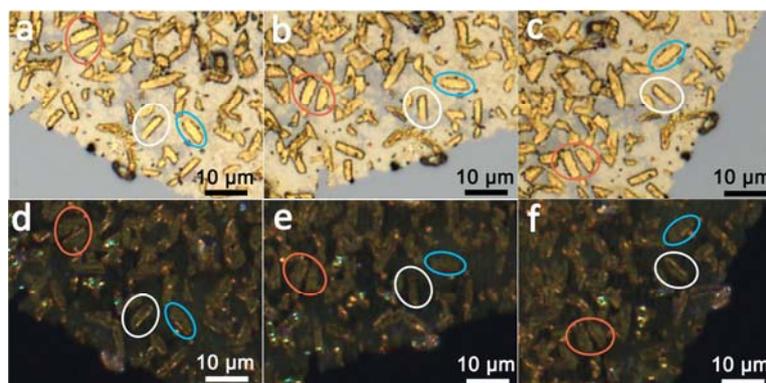


Fig. S9 Optical micrographs (a-c) and cross-polarized micrographs (d-f) of flatly aligned, supercrystalline microplates with different rotation angles: (a,d) 0°, (b,e) 45°, and (c,f) 90°. The white, blue and red circles highlight three representative areas. The flatly aligned microplates were obtained by washing the vertically aligned microplates with ethanol under drastic vibration.

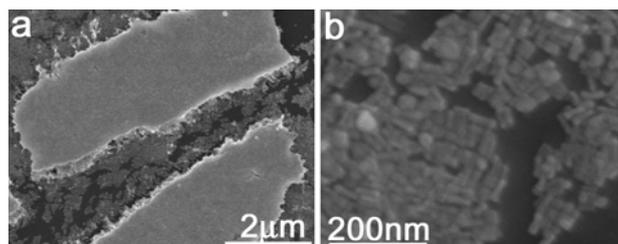


Fig. S10 SEM images of flatly aligned, supercrystalline microplates as well as the randomly aggregated GNRs distributed among the microplates, which brought about the yellow background of the optical micrographs shown in Fig. S9.