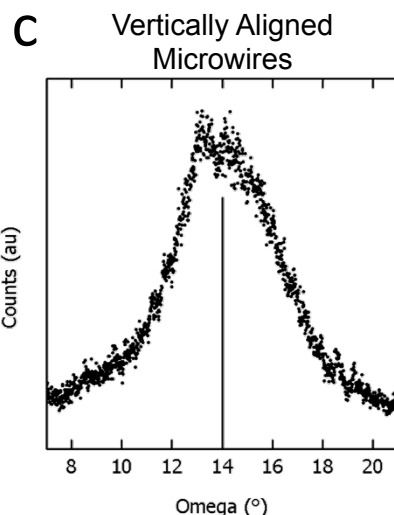
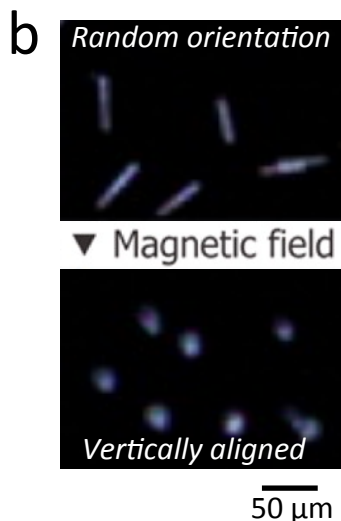
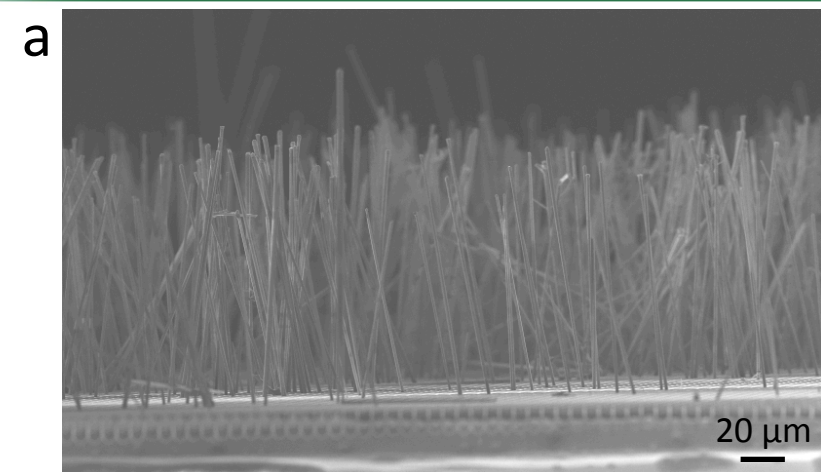


Magnetic Alignment of High-Aspect Ratio Microwires into Vertical Arrays



(a) SEM and (b) dark-field optical images of Ni-coated Si wires aligned into a vertical array by a magnetic field; (c) XRD rocking curve demonstrates 97% of microwires are aligned to within $\pm 5^\circ$ of substrate normal

Scientific Achievement

Si microwires have been aligned into vertical arrays using inexpensive, cleanroom-free techniques, showing promise for applications in electronic devices such as solar cells.

Significance and Impact

This work represents a unique method for the vertical alignment of high-aspect ratio microstructures using directed assembly techniques.

Research Details

- Ni was electrodeposited in solution onto Si microwires to serve as a ferromagnetic handle.
- The microwires were aligned in magnetic fields ranging from 300 G to 2 kG, with alignment percentage dependent on Ni thickness, wire geometry, and substrate surface chemistry.

J.A. Beardslee, B. Sadtler, N.S. Lewis, *ACS Nano* **6**, 10303-10310 (2012)

Work was performed at Caltech

