

## A Highly Efficient Moisture-Driven Power Generator Fabricated by Laser-Induced Graphitization

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We used a CO<sub>2</sub> laser engraver to create a conductive graphitic carbon layer (GCL) directly on a porous cellulose nanofiber (CNF) substrate at ambient conditions. By focusing the laser beam on the top surface of the CNF substrate, higher conversion of the CNF to GCL was achieved on the top surface than the bottom surface. An oxygen-to-carbon ratio (O/C) gradient was established between the top and bottom surfaces during laser induced graphitization (LIG), as the O/C of the GCL decreased with laser intensity. When the GCL with the O/C gradient was exposed to water vapor, hydrolysis of the carboxyl groups in the GCL produced hydrogen ions. The resulting hydrogen ion concentration gradient between the top and bottom surfaces created electricity. The performance was significantly improved using GCLs obtained from salt rich CNFs.