Scientific Achievement
Using the electrochemically driven formation of porous Si, broadband gradient refractive index (GRIN) optics including lenses were fabricated. The structures formed had very large refractive index gradients of up to 3 RI units, enabling formation of lenses with focal points on the surface of the lens.

Significance and Impact
GRIN optics uniquely control light and are broadband, an important property for many applications, but fabrication remains challenging.

Research Details
– The refractive index of porous silicon (PSi) is a function of the etch current
– 3D Si-based GRIN micro-optics formed through controlled electrochemical etching of PSi
– Polarization sensitive micro-optics also demonstrated