

## High-performance nanoporous silicon-based photodetectors

### ABSTRACT

A series of porous silicon (PSi) samples was prepared using photoelectrochemical etching (PECE) method with optimum current density of 45 mA/cm<sup>2</sup>. The as-prepared PSi samples were characterized to determine the influence of the etching time (15, 25 and 30 min) on their morphology and electrical properties. The percentage of porosity was estimated via gravimetric analysis. The band gap of the fabricated PSi was  $\approx 2.22$  eV. Upon their use to fabricate metal-semiconductor-metal (MSM) ultraviolet photodetectors (UVPD), the fabricated PSi revealed excellent stability and reliability under repetitive shots at 530 nm. Furthermore, very fast rise time ( $\approx 0.28$  s) was obtained at a bias of 1 V under visible light (530 nm) illumination.

**Keyword:** Porous silicon; Etching time; Electrical properties; Photodetector