

Impact of KOH etching on nanostructure fabricated by local anodic oxidation method

ABSTRACT

In this letter, we investigate the impact of potassium hydroxide (KOH) etching procedure on Silicon nanostructure fabricated by Atomic force microscopy on P-type Silicon-on-insulator. An electrochemical process, as the local anodic oxidation followed by two wet chemical etching steps, KOH etching for silicon removal and hydrofluoric etching for oxide removal, were implemented to fabricate the silicon nanostructures. The effect of the pure KOH concentrations (10% to 30% wt) on the quality of the surface is studied. The influence of etching immersing time in etching of nanostructure and SOI surface are considered as well. Impact of different KOH concentrations mixed with 10% IPA with reaction temperature on etch rate is investigated. The KOH etching process is elaborately optimized by 30%wt. KOH + 10%vol. IPA in appropriate time and temperature. The angle of the walls in etch pit for extracted nanowire reveals some deviation from the standard anisotropic etching.

Keyword: Local anodic oxidation (LAO); Silicon-on-insulator (SOI); Potassium hydroxide (KOH) wet chemical etching; Isopropyl alcohol (IPA).