

PNZT Coated Wafers with Platinum Bottom Electrodes

Description:

The product starts with a silicon wafer having half a micron of thermally grown silicon dioxide on its surface. The customer may specify the wafer type for purchase by Radiant or the customer may supply the wafers. Otherwise, Radiant generally uses 500 μ thick <100> boron doped silicon wafers with a nominal doping level of 10^{15} . Radiant deposits a 400 \AA layer of titanium dioxide on the surface of the silicon dioxide followed by 1500 \AA of pure platinum. The platinum is not patterned. Radiant then deposits 4% niobium doped 20/80 PZT (PNZT) on the platinum surface using a MOD technique. PNZT sintering takes place at 650 $^{\circ}\text{C}$.

The top surface of the silicon wafer may be silicon nitride instead of silicon dioxide. As well, the customer may elect to supply wafers having other mechanical features in or under the silicon surface. The primary requirement is that the surface of the wafer be silicon dioxide or silicon nitride. The maximum temperature seen by the wafers during processing is 850 $^{\circ}\text{C}$.

It is possible to deposit the platinum/PNZT layers on both sides of double side polished wafers. In this case, the bottom electrode is deposited on both sides first followed by the PNZT on one side and closing with the PNZT on the other.

Substrates other than standard silicon wafers may be used. Radiant has successfully deposited the platinum/PNZT stack on both sides of double-side polished quartz wafers. Thin silicon wafers may also be used in place of the standard 500 μ thick silicon wafers but allowances must be made for breakage during processing.

Specifications:

Titanium dioxide:	400 \AA \pm 50 \AA
Platinum:	1500 \AA \pm 100 \AA
PNZT:	
[2000 \AA	\pm 100 \AA
> 2000 \AA	\pm 150 \AA