Field Emission Study of Ti-Silicide Array - M.-Y. Choi, S.S. Choi (Sun Moon University), S.B. Kim, and H.T. Jeon (Hanyang University)

The Si FEA(field emitter array) was fabricated on the n-type, low resistance (5 ohm-cm) Si(100) wafer through anisotropic etching with dipping in 40 wt.% KOH solution. To increase the thermo-chemical durability of tip, long term stability, and current density, Ti(30nm) film was deposited with evaporation and the silicide was formed by annealing at 650℃. The C54-TiSi2 phase of the sample was formed using XRD analysis. The emission characteristics of the Ti-silicide FEA were compared with those of Si FEA under high vacuum condition of about 10-7Torr. The turn-on voltage of Ti-silicide FEA is about 1500V. On the other hand, the turn-on voltage of Si FEA is found to be 1950 V. In addition, the emission stability of the Ti-silicide FEA showed much better that that of Si FEA.

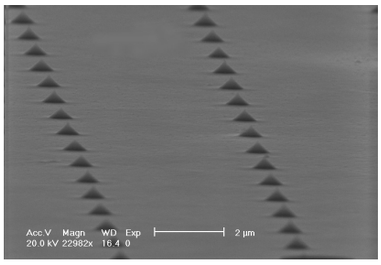


Fig.1. Fabricated Si-FEA

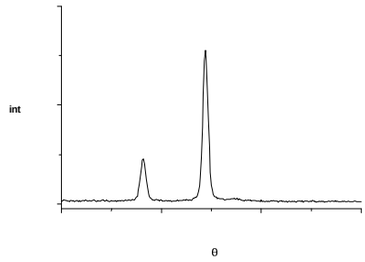


Fig.2. XRD analysis presents formation of Ti-Silicide after Annealing of the Ti deposited Si-FEA.

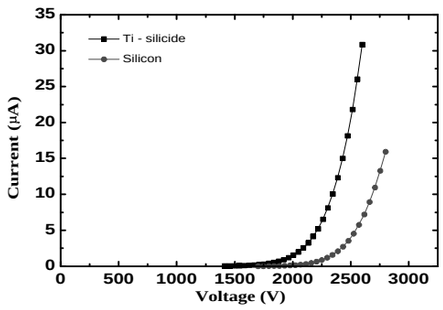
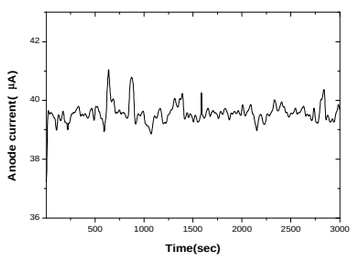


Fig.3. The I-V graph presents lower turn voltage of the Ti-FEA compared with that of Si-FEA.



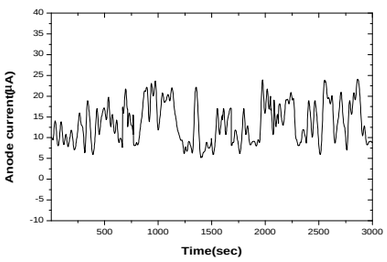


Fig.4. and Fig.5. These graphes presents better emission stability of Ti-silicide FEA compared with that of Si-FEA.