Reproducibility of silicon single electron quantum dot transistor

In principle, based on the form of tunnel junction, single electron transistor (SET) can be classified into four types, i.e. nanowire SET, quantum dot SET, nanotube SET and point contact SET. Another classification is SET based on the kind of conducting material between gate and island, which consists of resistive-SET and capacitive SET. There are about 18 types of SET designs have previously published by many researchers. This paper describes each SET design of 18 all in the reproducibly design point of view at most the form of source-drain contact junction, layers structure, and the modification of fabrication technology. The reproducibility of single electron transistor can be observed from the equity of design, dimension and device characteristics. Indeed, the forms of SET source-drain contact junction have very large influences on the difficulties level of fabrication processes and electrical characteristics.