



ABSTRACT

A process for characterizing defects in semiconductors or insulators using a zero-bias thermally stimulated current technique wherein parasitic current is eliminated by the use of a novel ZBTSC apparatus that eliminates temperature gradient across a sample is described. The novel ZBTSC apparatus comprises a cold finger on a cyrostat. A sample holder is attached to the cold finger. A probe holder is attached to the cold finger. A probe is attached to the probe holder. A feedback temperature control keeps the probe and the cold finger at the same temperature. Alternatively, the sample holder may be attached to a first cold finger and the probe holder attached to a second cold finger. Feedback temperature controls for each cold finger are programed such that their temperatures are kept the same. The improved zero-bias thermally stimulated current technique of the invention comprises mounting a sample on the sample holder of the novel ZBTSC apparatus. The sample is excited at a first temperature to fill up defect traps with carriers and then heated to a second temperature higher than the first temperature wherein the heating is a linear function with respect to time. Defects are characterized by measuring current due to emission of the carriers from the defect traps as a function of temperature wherein the measuring is performed by the probe of the novel ZBTSC apparatus.