

# Investigation of the Switching Phenomena in TlGaSe<sub>2</sub> Single Crystal

**S.A. Hussein, G. Attia<sup>1</sup>, S.R. Al harbi<sup>2</sup>, A.A. Al Ghamdi<sup>3</sup>,  
F.S. Al Hazmi<sup>3</sup> and S.E. Al Garni<sup>2</sup>**

*Physics Department, Faculty of Science, South Valley University,  
Fayoum University<sup>1</sup>, Egypt, and Girls Colleges of Education<sup>2</sup>,  
Faculty of Science<sup>3</sup>, King Abdulaziz University, Saudi Arabia*

*Abstract.* An Investigation was made of switching in TlGaSe<sub>2</sub> single crystals under static condition. Current-controlled negative resistance (CCNR) in TlGaSe<sub>2</sub> single crystals have been observed for the first time. It has been found that Thallium gallium diselenide single crystals exhibit bistable or memory switching. The results strongly indicated that the phenomenon in our sample is very sensitive to temperature, light intensity and sample thickness. The current-voltage characteristics is symmetrical with respect to the reverse of the applied voltage and current. The switching parameters were checked under the influence of different factors of the ambient condition.