

ΠΑΝΕΠΙΣΤΗΜΙΟ ΚΡΗΤΗΣ
ΤΜΗΜΑ ΕΠΙΣΤΗΜΗΣ ΚΑΙ ΤΕΧΝΟΛΟΓΙΑΣ ΥΛΙΚΩΝ

ΠΑΡΟΥΣΙΑΣΗ ΜΕΤΑΠΤΥΧΙΑΚΟΥ ΔΙΠΛΩΜΑΤΟΣ ΕΙΔΙΚΕΥΣΗΣ

Τίτλος

«Optical and Electronic properties of few layers of GeSe»

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Κτίριο Τμήματος Χημείας,

Πανεπιστήμιο Κρήτης

The successful isolation of graphene and its extraordinary properties attracted the scientific interest and created research opportunities towards applications in next generation optoelectronics. However, graphene's utility is limited due to the lack of a bandgap. Transitions Metal Dichalcogenides (TMDs) and some other layered IV-VI compounds are considered alternatives to graphene since they display a 2D structure along with a finite energy gap. In this thesis, we study GeSe, a IV-VI layered compound semiconductor that undergoes an indirect-to-direct gap transition at the bilayer and monolayer limit according to recent theoretical calculations. In addition, GeSe monolayer is predicted to have a strong absorbance in the visible range. To this end, several exfoliation techniques have been used to create a single or a double layer of GeSe and verify all the unique properties the theory predicts. However, results revealed the unstable nature of GeSe crystal and its tendency to change its phase into the more stable GeSe₂, motivating us to investigate the conditions that can trigger this phenomenon.