# **Structural and Morphological Study of Hydrothermal Synthesis MoSe2 Nanoflowers and its Application in Photodetection**

**Abstract:**

This study investigates the photodetection properties of molybdenum diselenide (MoSe2) nanoflowers. The MoSe2 nanoflowers were synthesized via a simple hydrothermal method and characterized using various techniques, including scanning electron microscopy (SEM), transmission electron microscopy (TEM), Raman microscopy, and X-ray diffraction (XRD). The photodetection performance of the MoSe2 nanoflowers was evaluated by Keithley 2400 source meter and the results showed that the nanoflowers exhibited high sensitivity to light in the visible range with a responsivity of up to 0.20 A/W. The fast response time of the nanoflowers was also demonstrated, with a rise time of 30 ms and a decay time of 44 ms. The high sensitivity and fast response time of the MoSe2 nanoflowers makes them promising candidates for use in optoelectronic devices such as photodetectors and photovoltaic cells. This work provides a valuable contribution to the ongoing research on 2D materials for optoelectronic applications.

**Keywords:** Nanoflower, Photodetection, Fast response, optoelectronics, responsivity