



## Center for Nanoscience and Nanotechnology

### **Manufacturing a self-generated light sensor based on a triboelectric nanogenerator for monitoring health variables**

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#### **Abstract**

Continuous monitoring of health variables requires convenient and affordable measuring devices. Therefore, non-invasive methods are the most desirable. Among these methods, the optical method is of great interest due to its high accuracy, cleanliness and availability. Another necessary condition to achieve continuous monitoring of health variables is the lightness and portability of measuring devices, which is why the power source becomes very important. Due to the fact that the battery is not always available, needs to be replaced and creates environmental pollution, it can be replaced with better sources of power, such as the triboelectric nanomodule, which converts environmental mechanical energy into electrical energy. In this research, the construction of a light sensor using two-dimensional structures of transition metal chalcogenides and then coupling it with a triboelectric nanomodule as a power source has been discussed. Molybdenum disulfide has been used as the most famous of this group of materials, which has shown good optical responses alone or in combination with other materials. Two methods of hydrothermal and sputtering as bottom-up methods and two methods of liquid phase vaporization and mechanical vaporization as top-down methods have been used to build the two-dimensional structure of molybdenum disulfide. Finally, it is intended to measure heart rate and breathing rate using this method and compare it with simultaneous clinical data.