22nd Iranian Inorganic Chemistry Conference,
23-25 August, 2023
University of Kurdistan

Green Synthesis of Zinc Oxide with Polyvinyl alcohol by lavandulifolia Extract and development of hydrogen storage capacity

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The United Nations General Assembly, in its declaration of the right to development (1986), declared energy in different forms an essential need to achieve the specified targets [1]. Today, most energy needs are met through non-renewable sources [2]. The use of non-renewable resources in addition to the environmental issues due to long-term use has reached a saturation level [3]. Therefore, renewable sources for energy production at different levels are in demand. Among the renewable sources, hydrogen is one of the most attractive [4]. At the same time, this energy carrier needs efficient and secure storage to have a bright future [5].Polyvinyl alcohol (PVA) with high active sites is used as natural layered mineral supports. ZnO as a conductive additive was decorated on a PVA support to design an effective and environmentally friendly active material. Herein, an eco-friendly PVA/ZnO nanocomposite is fabricated via a green method to equip developed hydrogen storage sites and to allow for quick charge transportation for hydrogen storage utilization. The hydrogen storage capacity of PVA/ZnO was 300 $mAhg^{-1}$ at a current density of 1 mA after 5 cycles. It was also conceivable to increase the hydrogen sorption ability through ZnO in the nanocomposite.

Keywords: ZnO,Hydrogen storage, PVA/ZnO

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