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Synthesis of crystalline $\text{Na}_2\text{V}_6\text{O}_{15} \cdot 3\text{H}_2\text{O}$ nanowires obtained by hydrothermal method

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Recently, alkali-metal vanadium oxides bronzes have attracted much interest due to a wide range of application such eletrochromic devices, humidity sensor, etc. The main objective of this work is study the synthesis of $\text{Na}_2\text{V}_6\text{O}_{15} \cdot 3\text{H}_2\text{O}$ nanostructures using a “simple” and “clean” method. In a typical procedure, the mixed solution was prepared containing 0.06M of peroxovanadate with 12 ml of 0.1M NaOH solution. Then, this mixed solution was placed in a 100 mL hydrothermal cell. The hydrothermal cell was maintained at 140 °C for 24 h and then cooled in ice bath to room temperature. The brownish-red precipitate was dried at 50 °C for 24 h. X-ray analysis revealed the formation of $\text{Na}_2\text{V}_6\text{O}_{15} \cdot 3\text{H}_2\text{O}$ nanoparticles. The water content in the synthesized products was confirmed by Thermal Gravimetric Analysis. The Transmission Electron Microscopy shows that obtained products have a uniform wire-like morphology with around 7-25nm of width and e and 5-15µm of length.