CHAPTER 5

CONCLUSIONS

5.1 CuS synthesized via direct current heating

Nanostructured CuS flowers and nanostructured CuS composing of nanoparticles with different orientations were successfully produced from a 1:1 molar ratio of Cu:S powders using a transient solid-state method, by the direct flow of DC current through the solids. The phase and morphologies were clearly detected. Their vibrations were at 474.5 cm^{-1}, and photoluminescence at 347.5 nm. The complete flower-structured CuS, produced for 5 s, was the best crystal. Its Raman and PL intensities were at the highest. A number of the (002) crystallographic planes were detected on its petal.

5.2 AlSb synthesized via direct current heating

Pure AlSb nanocrystals were successfully produced by the direct flow of electrons through solid mixtures – the novel, fast, effective, and environmentally benign process. The phase and nanocrystals were clearly detected, including three Raman shifts at 113.3, 145.9, and 320.2 cm^{-1}. Indirect energy band gaps are 1.647 eV and 1.688 eV, for AlSb nanocrystals with the sizes of 50 nm and 20 nm, respectively.

5.3 CuS-PEG composited electrolyte on quasi solid- state ZnO DSSCs

The quasi solid-state ZnO DSSCs with different weight percent of copper sulfide nanoplates were mixed to CuS-PEG composite electrolyte and found that the polymer nanocomposited electrolyte with increasing of weight percent of CuS nanoplate powder is correlated with the increase in the V_{oc}, I_{sc}, FF, and the efficiency of this device. For 0.5 wt% CuS-PEG electrolyte, DSSC exhibited the highest efficiency.