Conclusion

In conclusion, we have fabricated P3HT/PCBM blended Solar Cells by spin coating method and we have compared it with ZnS doped PEHT/PCBM blend. Though there was an increase in open circuit voltage and short circuit current with respect to the undoped sample, the efficiency obtained is quite low as compared to the reported paper. The power conversion efficiency of the device reached as high as 1.18% under (100 mW/cm^2) illumination.

Along with the fabrication process, we have successfully conducted the synthesis of bean-like ZnS nanostructures by a simple aqueous chemical method using pure aqueous route resulting in primary particle sizes of 12 nm. This particle size was calculated from the Debye- Scherrer formula. SEM image is used to study the morphology of the synthesized nanoparticles. FTIR spectra showed the possible stretching and bending modes of the ZnS. UV spectra revealed that the absorption band was blue shifted from the bulk. Photoluminescence investigation evidenced the high crystalline nature of the ZnS nanoparticles.

Although the best photovoltaic polymer based solar cells that have been produced so far are less efficient that their silicon counterparts, they produce much higher open circuit voltages. The carrier mobility of semiconducting organics remains around 10^{-3} $cm^2/V\text{-}s$ while the mobility of single crystalline silicon is of the order of about 10^3 $cm^2/V\text{-}s$. This indicates that the photogenerated charge carriers in semiconducting organics require more time to be collected from electrodes. The slow charge transport itself decreases the efficiency of the organic solar cell but at the same time, increases the chance of charge carrier recombination in the device.