

assembled monolayer (SAM) chemisorbed on ZnO nanowires.

The application as photocatalysis of the heteronanostructures was studied using UV/visible light decomposition of organic dyes, and the results were compared with bare ZnO nanowire sample. Heteronanostructures have showed much enhanced photocatalytic efficiencies, and the mechanism will be discussed. Also, solar energy conversion devices were fabricated using ZnO nanowire heterostructures as photoanodes. Quantum dot sensitized solar cell (QDSSC) performances were investigated using heterostructured nanowires. Depending on the growth conditions and methods, QDSSCs have shown various efficiencies and also light absorption properties. Optimization of QDSSCs and basic functioning mechanism were systematically studied and will be discussed in this presentation.

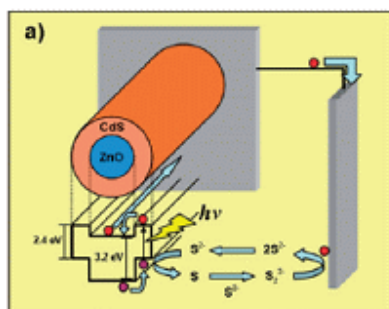


Figure 2. Schematic illustration of solar energy conversion device using CdS/ZnO heterostructured nanowires.[6]

Conclusion

ZnO nanowires and various heterostructured nanowires array were fabricated through low temperature solution reaction method. The applications of these nanowires were studied for wettability control of the surface, photocatalysis and quantum dot sensitized solar cells, which shows high solar energy conversion efficiencies.

References

1. Levy-Clement, C.; Tena-Zaera, R.; Ryan, M. A.; Katty, A.; Hodes, G. *Adv. Mater.* 2005, **17**,1512.
2. Takanezawa, K.; Hirota, K.; Wei, Q. S.; Tajima, K.; Hashimoto, K. *J. Phys. Chem. C* 2007, **111**, 7218.
3. Baxter, J. B.; Aydil, E. S. *Appl. Phys. Lett.* 2005, **86**, 053114.
4. Gao, Y.; Nagai, M.; Chang, T. C.; Shyue, J. J. *Cryst. Growth Des.* 2007, **7**, 2467.

5. K. Y. Tak, S. Hong, J. Lee and K. Yong, "Solution-Based Synthesis of CdS Nanoparticle/ZnO Nanowire Heterostructure Array", *Crystal Growth and Design*, **2009**, 1627-2632.

6. Y. Tak and K. Yong, "Controlled growth of well-aligned ZnO nanorod array using a novel solution method", *Journal of Physical Chemistry B*, 109(41), **2005**, 19263-19269.