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## Optimisation of inorganic-organic photoactive hybrid film for photovoltaic application.

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Photoactive hybrid films based on inorganic-organic nanocomposites have attracted a lot of attention for fabrication of low cost and environmental friendly off grid photovoltaic devices.<sup>1,2</sup> In particular, silicon nanowires (SiNWs), electron accepting materials and poly (3-hexylthiophene) (P3HT), electron donor conjugated polymer are promising candidates due to high optical absorption and excellent charge carrier mobility associated with them respectively.<sup>3,4</sup> An objective of the study was to establish optimised spin coating conditions for P3HT film deposition with high film uniformity and electrical conductivity in order to incorporate SiNWs for enhancement of optical and electrical properties of the film. Spinning speed, duration and solution concentration were studied as experimental parameters. Uniform films with satisfactory electrical conductivities were obtained.

**Keywords:** Spin coating, inorganic-organic nanocomposites, photoactive hybrid film

**References**

1. M. Braik, C. Dridi, A. Rybuk, J. Davenas and D. Cornu. Physica Status Solid Applications and Materials, (2013) 1-7.
2. J. Davenas, S.B. Dkhil, D. Cornu and A. Raybak. Energy Procedia, 31 (2012) 136-143.
3. W. Cao, A. Uddin and M. Wright. Solar, 2012, the 50th AuSES Annual Conference.
4. K. Liu, S. Qu, X. Zhang, F. Tan and Z. Wang. Nanoscale Research letter, 8 (2013) 1-6.

### Summary

In summary, the polymer was dissolved in a binary solvent of dichlorobenzene and chloroform. Subsequently, SiNWs synthesised via metal assisted chemically etching were added into solution. The mixture was then stirred on digital hot plate stirrer at room temperature for at least 12 hours. The resulting solution which consisted of both SiNWs and P3HT was then deposited on a glass substrate by means of spin coating. Finally, the thickness measurements, electrical and optical properties investigations were performed using Dektak 6M stylus profiler, Hall effect measurement system(HMS-3000) and Optical mini spectrometer respectively.

**Apply to be considered for a student award (Yes / No)?**

Yes

**Level for award (Hons, MSc, PhD, N/A)?**

MSc

**Main supervisor (name and email) and his / her institution**

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**Would you like to <br> submit a short paper <br> for the Conference <br> Proceedings (Yes / No)?**

Yes

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