

Fabrication of $\text{Cu}_2\text{ZnSnS}_{4-x}\text{Se}_x$ thin films by a non-vacuum, nanoparticle-based approach

Objective

Preparation of high quality $\text{Cu}_2\text{ZnSnS}_{4-x}\text{Se}_x$ (CZTSSe) thin films by a low-cost, non-vacuum approach.

Advantages

- Providing a possibility to fabricate CZTSSe solar cells with low cost.
- CZTSSe is a rare-metal free material with low toxicity towards the environment.



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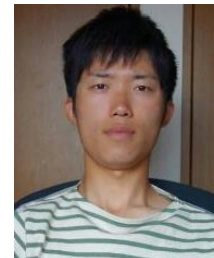
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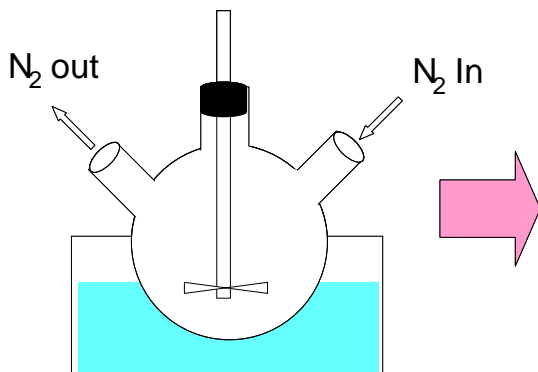


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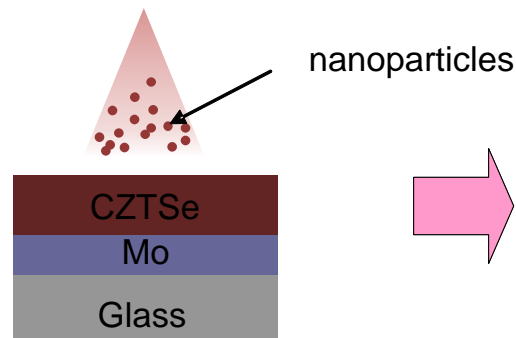


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Synthesis of CZTSe nanoparticles



Preparation of CZTSe films



Selenization and Sulfurization

