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Tang, Yingying; Chi, Qijin

*Published in:*  
Book of Abstracts, Sustain 2017

*Publication date:*  
2017

*Document Version*  
Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

*Citation (APA):*  
Tang, Y., & Chi, Q. (2017). Inorganic ions assisted design and synthesis of all-inorganic halide perovskite nanowires for sustainable solar-energy harvesting. In *Book of Abstracts, Sustain 2017* Article M-14 Technical University of Denmark.

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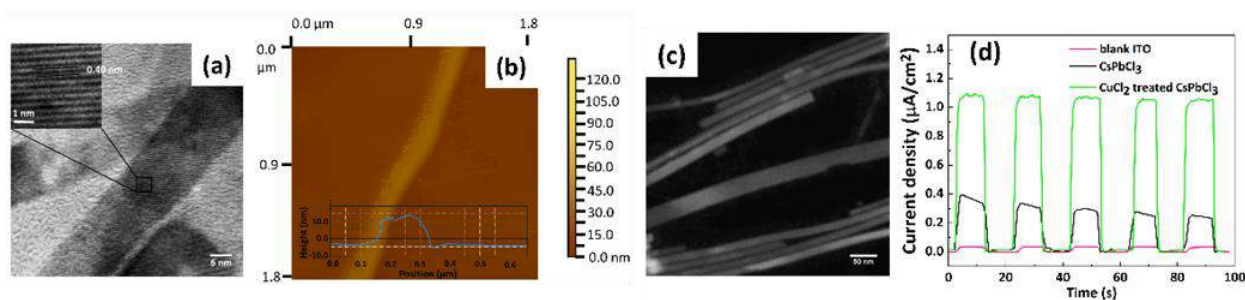
# Inorganic ions assisted design and synthesis of all-inorganic halide perovskite nanowires for sustainable solar-energy harvesting

Yingying Tang, Qijin Chi\*

DTU Chemistry, Technical University of Denmark, DK-2800 Kongens Lyngby, Denmark.

\* Corresponding author email: [cq@kemi.dtu.dk](mailto:cq@kemi.dtu.dk)

Metal halide perovskites with unique physicochemical properties have emerged to the forefront of light absorber materials, because of their great potential for solar cells, photodetectors, light-emitting devices, field-effect transistors and lasers.<sup>1,2</sup> Tunable wavelength, large diffusion length, long carrier lifetime, scalable and cost-efficient production are their most striking characteristics. These characters are, however, morphology and size dependent. To date, researchers have successfully engineered perovskites in the forms of nanocubes, nanospheres, and nanoplatelets with sizes controlled from several to hundreds of nanometers. However, the synthesis of perovskite nanowires with controlled morphology is rarely successful. In this communication, we show the feasibility of the controlled synthesis of CsPbCl<sub>3</sub> nanowires via the pretreatment by Cu<sup>2+</sup> ions.<sup>3</sup> The resulting nanowires have a diameter of ca. 20 nm and an average length of 500 nm, with their structures and photoelectrochemical performance systematically studied. These CsPbCl<sub>3</sub> nanowires enabled a 3.5-fold photocurrent enhancement compared to untreated nanocubes. The results clearly suggest that they are a promising photonic material for fabrication of ultraviolet detection devices, as well as our newly developed method could be a generally effective way in controlling morphology and opto-electronic properties of all-inorganic halide perovskite nanostructures.



**Figure 1. Characterizations of CuCl<sub>2</sub> pretreated CsPbCl<sub>3</sub> nanowires: (a) TEM image, (b) AFM image, (c) STEM image, and (d) comparison of photocurrent responses obtained at various photoelectrodes.**

## References

- (1) Green, M. A.; Ho-Baillie, A.; Snaith, H. J. *Nature Photon.* **2014**, *8*, 506-514.
- (2) Grätzel, M. *Nature Mater.* **2014**, *13*, 838-842.
- (3) Tang, Y.; Chi, Q. *The manuscript in preparation* **2017**.

## Acknowledgement

This work was supported by the Villum Foundation (to Q.C. and Y.T.) and by Independent Research Fund Denmark-Nature Sciences (DFF-FNU, Project No. DFF-7014-00302, to Q.C.). Y.T. is grateful for the Villum Foundation supported postdoc fellowship.