

# Multiscale Crystallization of Inorganic Functional Materials

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DOI: 10.5185/vpoam.2020.0843

## Abstract

Crystallization is a process from atoms, ions, molecules, or their combinations to build order structure. Crystallization studies of ceramic materials have long been attracting much attention of the community, which originate from multiscale control and design of both nucleation and crystal growth [1-3]. We proposed chemical bonding theory of single crystal growth to well understand crystallization of ceramic materials [1-3]. We use some physicochemical models to rationally design and develop solutions to searching for novel materials by using crystallization. Specifically, we use some physicochemical models to design artificial crystals with special properties according to people's needs, such as laser crystals and scintillation crystals. Our recent advances include the multiscale design of artificial crystal compositions and structures, crystal growth equipment and growth parameters, and the development of new preparation methods.

**Keywords:** Crystallization, multiscale, chemical bonding, single crystals, ceramics.

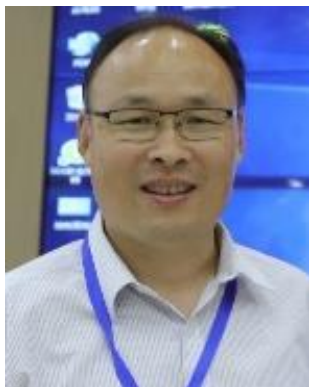
## Acknowledgement

The author greatly acknowledges the National Natural Science Foundation of China (Grant No. 51832007).

## References

1. D. Xue, J. Hu, X. Liang, and H. Wang, *Science China-Technological Sciences*, **2020**, 63(6), 1085-1086.
2. G. Garnweitner and D. Xue, *CrystEngComm*, **2020**, 22(9), 1498-1499.
3. C. Sun and D. Xue, *CrystEngComm*, **2019**, 21(12), 1838-1852.

## Biography of Presenting Author



**Dongfeng Xue**, Fellow of the Royal Society of Chemistry (FRSC), Corresponding Member of the European Academy of Arts, Sciences and Humanities (Paris), is now a full professor of Materials Chemistry and Engineering, director of State Key Laboratory of Crystal Materials in Shandong University, China. He received his Ph.D. degree in inorganic chemistry at Changchun Institute of Applied Chemistry in 1998. Following postdoctoral studies at Universität Osnabrück, University of Ottawa, National Institute for Materials Science in Tsukuba, he was promoted to a full professor in 2001 at Dalian University of Technology, China. In 2011, he returned to Changchun Institute of Applied Chemistry to assume his professorship in inorganic chemistry. In 2020, he moved to Shandong

University to take a full professor position in materials science and engineering. He has authored or coauthored more than 600 articles in peer-reviewed journals such as *Adv. Mater.*, *Adv. Energy Mater.*, *J. Am. Chem. Soc.*, *Phys. Rev. Lett.*, and *CrystEngComm*. He has delivered more than 50 invited lectures at international conferences. He has more than 20 Chinese patents on ceramics. He is a winner of China National Science Foundation for Distinguished Young Scholars (2011), and a winner of 2011 ISFM Excellent Scientist Award, 2019 ISMMM Outstanding Contribution Award, 2019 IUPAC & NMS Distinguished Award. He serves as associate editor of *CrystEngComm*, and editorial board member of several prestigious journals such as *Crystals*, *Materials*, *Science China Technological Sciences*, *Journal of Rare Earths*, *Materials Research Bulletin*, *Journal of Porous Materials*, *Functional Materials Letters*, and *Nanoscale Research Letters*. His research interests focus on multiscale crystallization of inorganic matter for energy and optical applications.

## Citation of Video Article

Vid. Proc. Adv. Mater., Volume 1, Article ID 200843 (2020)

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