**Metallic Glasses: A New Type of Environmental and Low-cost Catalysts**

Lai-Chang Zhang

*School of Engineering, Edith Cowan University, Australia,* *l.zhang@ecu.edu.au*

Metallic glasses (MGs), with their unique disordered atomic packing structure and superior catalytic capabilities, have gradually been realized with their significance in the field of catalysis. As a new type of promising catalyst, recent reports have demonstrated that MGs exhibit many excellent catalytic properties. Particularly, Fe-based MGs with high catalytic activity, relatively low material cost, and environmental friendly compatibility also emerge as advanced catalysts for wastewater treatment. As of now, Fe-based MGs have been recognized with ultrafast catalytic efficiency (e.g. within 5 - 10 min for dye degradation) and reliable structural stability (e.g. reusability up to 33 times) with a reduced metal leaching effect, compared with their crystalline counterparts. In addition, it has been reported that Fe-based MGs can not only completely degrade organic pollutants, but also effectively remove heavy metals (e.g. arsenic) and inorganic pollutants (e.g. nitrate) in the wastewater treatment. Very recently, the annealing-induced crystallized counterparts of Fe-based MGs have demonstrated their rejuvenated catalytic performance in the wastewater treatment, which has never been achieved before. The grain-size dominated catalytic efficiency in the fully crystallized Fe-based MGs opens a new window to further design novel catalysts with controllable efficiency for wastewater treatment. Therefore, MGs as a type of environmental and low-cost catalysts hold the promise for achieving industrialization and providing a cleaner world.

Reference

[1] L.C. Zhang, Z. Jia, F. Lyu, S.X. Liang, J. Lu, *Progress in Materials Science*, **2019**, 105, 100576.

[2] Z. Jia, X. Duan, P. Qin, W. Zhang, W. Wang, C. Yang, H. Sun, S. Wang, L.C. Zhang, *Advanced Functional Materials*, **2017**, 27, 1702258.

[3] Z. Jia, Q. Wang, L. Sun, Q. Wang, L.C. Zhang, G. Wu, J.H. Luan, Z.B. Jiao, A. Wang, S.X. Liang, M. Gu, J. Lu, *Advanced Functional Materials*, **2019**, 29, 1807857.

[4] S.X. Liang, Z. Jia, Y.J. Liu, W. Zhang, W. Wang, J. Lu, L.C. Zhang, *Advanced Materials*, **2018**, 30, 1802764.

[5] S.X. Liang, W. Zhang, L. Zhang, W. Wang, L.C. Zhang, *Sustainable Materials and Technologies*, **2020**, <https://doi.org/10.1016/j.susmat.2019.e00126>.