

Tetraethyl orthosilicate (TEOS) production from biomass

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Tetraethyl Orthosilicate (TEOS) has many applications, while the present industrial production from SiCl_4 or Si accompanies with huge amount of HCl used/produced or harsh conditions needed. Meanwhile, the researches on the production of TEOS using SiO_2 as starting material usually require multi-step reactions and the use of strong bases. Given the current trend for sustainable development, the synthesis of TEOS from biomass attracts much attention.

This study highlights recent advances in the production of TEOS from biomass. The kinds of biomass used, physical, chemical and biological pretreatment of rice straw on the preparation of TEOS were explored with emphasis on silicon's form and transformation mechanism. The connection of silicon with other components in lignocellulose biomass was probed, and the combined valorization of both inorganic ash and organic components was achieved. Amorphous silica could also be converted to siloxane with simultaneously conversion of mixed biomass. Efficient preparation of alkoxy silanes from biomass-enriched silica sources and their autocatalytic mechanisms were revealed. The conceptualization, synthesis, and detailed examination of TEOS production from biomass were comprehensively addressed [1-4].

References

- [1] S. Feng, J. Fan, Q. Sun, W. Zheng, C. Hu, J.H. Clark, *J. Clean. Prod.* **452** 142185 (2024)
- [2] S. Feng, X. Liu, J. Fan, C. Hu, J.H. Clark, *Adv. Energy Sustain. Res.* **2**(10) 2100059 (2021)
- [3] Q. Sun, S. Feng, G. Li, Y. Qi, C. Hu, *ChemistryOpen* **12**(8) e202300111(2023)
- [4] S. Feng, C. Ge, Q. Sun, W. Zheng, G. Li, C. Hu *Chem. Eng. J.* (revised)

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BIO

Prof. Dr. Changwei Hu received his Bachelor, Master, and Ph.D. from the Sichuan University. He has been Professor at Sichuan University since 1996. Fellow of the Chinese Chemical Society; Fellow of the Royal Society of Chemistry; Member of the Scientific Board of the International Sustainable Chemistry Collaborative Centre (ISC3); RSC Green Chemistry series Editorial Board (advisor); International Advisory Board of ChemSusChem; Associate Editor of Sustainable Chemistry for the Environment; Associate Editor of Innovation Discovery; Member of Editorial Board for Catalysts, Biomass, Current Organocatalysis, Journal of Modern Agriculture and Biotechnology; etc. Highly Cited Scholar in China by Elsevier since 2021, Excellent National Teacher of Teaching (China), and Special Allowances Expert of the State Council, China. His current research interests include the catalytic conversion of bio-based materials (bio-oil, sugars, raw algae, and lignocellulosic biomass) into fuels and useful chemicals; catalytic functionalization of C-H bonds from the viewpoint of atom economy; catalytic activation of green house gases; molecular modeling on catalytic systems; and other green chemistry interrelated researches. He has published more than 500 papers in peer-reviewed journals, and authored more than 30 patents.