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Bimetallic Ni–Cu/ZSM-5 Catalysts for Enhanced Phenol and Vanillin Production from Benzyl Phenyl Ether and Lignin

Arnia Putri Pratama^{1,2}, Iman Abdullah^{1,2}, Yuni Krisyuningsih Krisnandi^{1,2} *

¹ Department of Chemistry, Faculty of Mathematics and Natural Sciences, Universitas Indonesia, Kampus UI Depok, Depok 16424, Indonesia

² Solid Inorganic Framework Laboratory, Department of Chemistry, Faculty of Mathematics and Natural Sciences, Universitas Indonesia, Kampus UI Depok, Depok 16424, Indonesia

* Corresponding Author. E-mail: yuni.krisnandi@sci.ui.ac.id (Y. K. Krisnandi)

Telp: +62-21-7270027, Fax: +62-21-7270012

Supplementary Figures

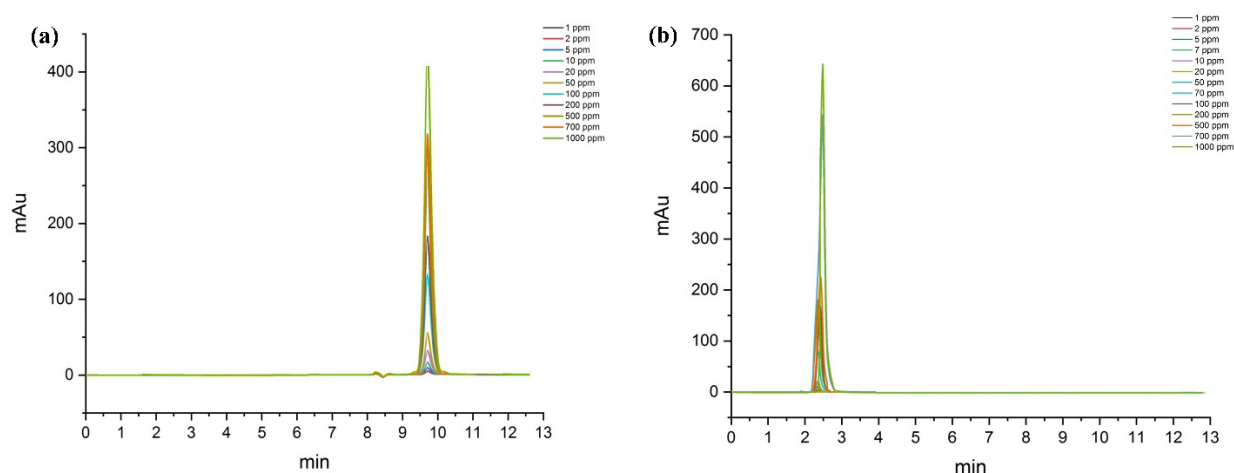


Figure S1. Standard solution analysis result with HPLC (a) Phenol (b) Vanillin.

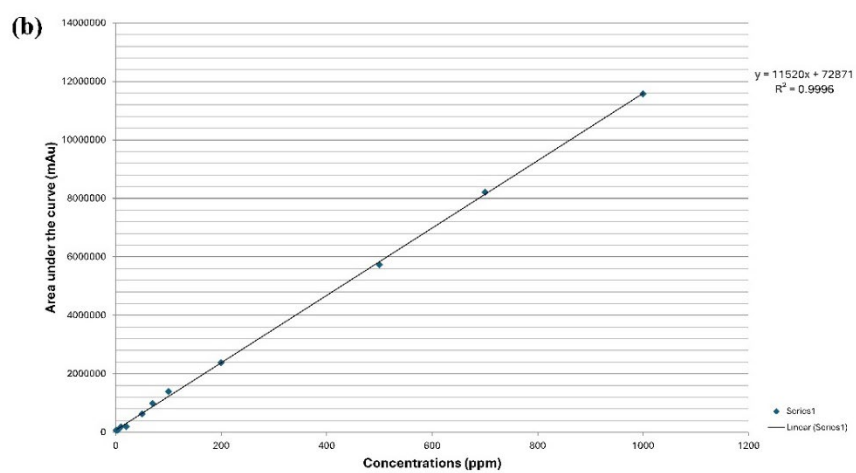
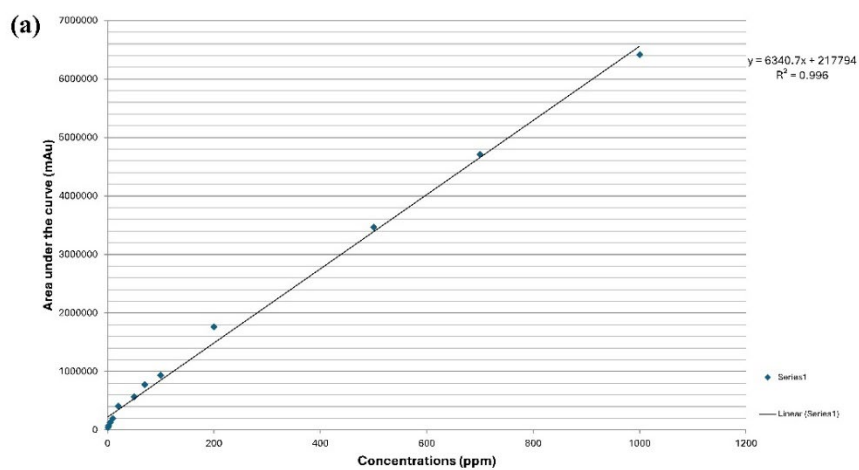


Figure S2. Calibration curves for (a) phenol and (b) vanillin standards.

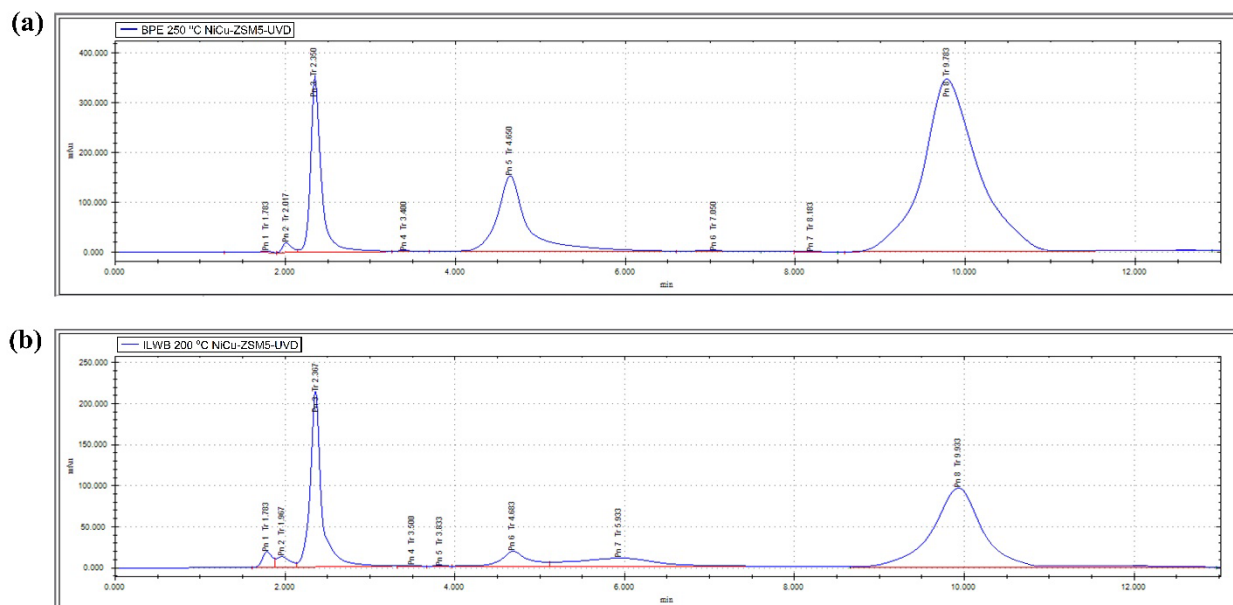


Figure S3. Representative HPLC chromatograms of liquid products obtained from the catalytic conversion of (a) benzyl phenyl ether (BPE) and (b) isolated lignin from raw woody biomass waste (ILWB) over Ni–Cu/ZSM-5, showing the identified phenol and vanillin peaks based on comparison with authentic standards.