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Porous Silica Particles as Oil Absorbents: Comparison of Meso- γ , β , Macro- γ , β , and Meso/Macro- γ , β Structures

[Kwang- \$\gamma\$, \$\beta\$ -Dae Kim](#)

Department of Chemistry, Sungkyunkwan University, Suwon, Republic of Korea

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Department of Chemistry, Sungkyunkwan University, Suwon, Republic of Korea

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[Sang Wook Han](#)

Department of Chemistry, Sungkyunkwan University, Suwon, Republic of Korea

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[Eun Ji Park](#)

Department of Chemistry, Sungkyunkwan University, Suwon, Republic of Korea

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[Dae Han Kim](#)

Department of Chemistry, Sungkyunkwan University, Suwon, Republic of Korea

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[Myung- \$\gamma\$, \$\beta\$ -Geun Jeong](#)

Department of Chemistry, Sungkyunkwan University, Suwon, Republic of Korea

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[Young Dok Kim](#)

Corresponding Author

E-mail address:ydkim91@skku.edu

Department of Chemistry, Sungkyunkwan University, Suwon, Republic of Korea

Biorefinery Research Group, Korea Research Institute of Chemical Technology, Daejeon, Republic of Korea

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[Jongwoo Moon](#)

Surface Technology Division, Korea Institute of Materials Science (KIMS), Changwon, Republic of Korea

[Search for more papers by this author](#)

[Eunmi Hong](#)

Surface Technology Division, Korea Institute of Materials Science (KIMS), Changwon, Republic of Korea

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[Dong Chan Lim](#)

Corresponding Author

E-mail address:dclim@kims.re.kr

Surface Technology Division, Korea Institute of Materials Science (KIMS), Changwon, Republic of Korea

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[Kwang-Jin Dae Kim](#)

Department of Chemistry, Sungkyunkwan University, Suwon, Republic of Korea

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[Youn Kyoung Cho](#)

Department of Chemistry, Sungkyunkwan University, Suwon, Republic of Korea

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[Sang Wook Han](#)

Department of Chemistry, Sungkyunkwan University, Suwon, Republic of Korea

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[Myung-Geun Jeong](#)

Department of Chemistry, Sungkyunkwan University, Suwon, Republic of Korea

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[Young Dok Kim](#)

Corresponding Author

E-mail address: ydkim91@skku.edu

Department of Chemistry, Sungkyunkwan University, Suwon, Republic of Korea

Biorefinery Research Group, Korea Research Institute of Chemical Technology, Daejeon, Republic of Korea

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[Jongwoo Moon](#)

Surface Technology Division, Korea Institute of Materials Science (KIMS), Changwon, Republic of Korea

[Search for more papers by this author](#)

[Eunmi Hong](#)

Surface Technology Division, Korea Institute of Materials Science (KIMS), Changwon, Republic of Korea

Korea

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[Dong Chan Lim](#)

Corresponding Author

E-mail address: dclim@kims.re.kr

Surface Technology Division, Korea Institute of Materials Science (KIMS), Changwon, Republic of Korea

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Abstract

Silica particles with three different pore structures were synthesized, consisting of only mesopores, only macropores, and both meso/macropores. The mesopores were approximately 30 nm in diameter, whereas the macropores were larger than 500 nm. By using chemical vapor deposition of polydimethylsiloxane (PDMS) on porous silica, the surfaces of the silica became completely hydrophobic. The surfaces on which the PDMS-coated silica particles were distributed showed water contact angles close to 170° and the particles floated perfectly on water. The silica with both meso and macropores showed a much higher oil absorption capacity (2.5–3 times higher capacity) than the other samples with either only meso or macropores. The superior oil absorption capacity of the meso/macroporous silica was primarily attributed to the extraordinarily high porosity.

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- Ju Ha Lee, Dae Han Kim, Sang Wook Han, Bo Ra Kim, Eun Ji Park, Myung-Geun Jeong, Ju Hwan Kim and Young Dok Kim, Fabrication of superhydrophobic fibre and its application to selective oil spill removal, *Chemical Engineering Journal*, 10.1016/j.cej.2015.12.026, **289**, (1-6), (2016).

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