

Efficient Separation of Bio-lipids from Microalgae by Surface Modification of Melamine Sponges

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Renewable energy sources like microalgal biofuels are intensively investigated nowadays. However commercialization of microalgal biofuels has been restrained due to high cost in dewatering process. Wet biomass extraction which extracts lipids directly and without dewatering step is appropriate way and the common method for it is solvent extraction. It produces a mixture of organic phase containing lipid and aqueous phase containing cell debris. Therefore, an effective separation process after lipid extraction is needed. 3-Dimensional melamine sponge is attractive for absorbing lipid due to its high porosity and high surface area. Because of its intrinsic amphiphilicity, surface modification of melamine sponge is needed. Initiated chemical vapor deposition process is used since it can conformally deposit polymers without damaging the complex skeleton. By depositing poly(3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10-heptadecafluorodecyl methacrylate) (pPFDMA) and poly(2,4,6,8-tetravinyl-2,4,6,8-tetramethyl cyclotetra-siloxane) (pV4D4), surface of melamine sponge becomes hydrophobic and oleophilic. This pPFDMA-L-pV4D4 coated sponge selectively absorbs organic phase and repels aqueous phase.