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The effect of added block copolymer on oil in oil emulsions ITARU ASANO, TIMOTHY LODGE, Univ of Minn - Minneapolis — Oil-in-oil emulsions, formed by polymer A and polymer B in the presence of an organic solvent (A/solvent-in-B/solvent), are a unique class of emulsion, because both phases are composed of organic components. Here, the effects of PS-*b*-PEGs (PS: polystyrene and PEG: polyethylene glycol) on the stability of the oil-in-oil emulsions composed of PS/$CHCl_3$-in-PEG/$CHCl_3$ were studied by varying the molecular weight ($20 < M_n < 200$ kg/mol) and the volume fraction ($0.40 < f_{PS} < 0.82$) of the PS-*b*-PEG. We found that higher M_n of PS-*b*-PEGs with low f_{PS} were able to stabilize the emulsions with reduced droplet size. In particular, using a large PS-*b*-PEG (200 kg/mol, $f_{PS} = 0.52$), the emulsion was stable for more than 2 weeks, and the droplet size decreased to the nanoscale, around 300 nm in diameter, whereas the emulsion was unstable with large droplets (>50 μm) without the PS-*b*-PEG. In order to reveal the mechanism of stabilization, dye-labeled PS-*b*-PEGs in the emulsions were directly monitored by fluorescence microscopy.

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