Standard Operating Procedure
(Suspension polymerization of acrylic acid)

Facility: Polymer Reaction Engineering Laboratory
Department of Chemical Engineering

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Scope: This SOP details the suspension polymerization of acrylic acid for work in the Polymer Reaction Engineering Laboratory.

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Caution: The chemicals used in this procedure are **hazardous**.

Always wear goggles, (face shield), rubber gloves, lab coat.

1. Melt the measured amount of Sodium Hydroxide (NaOH) (s) in the 15ml of water slowly.

2. Add the 17.9 ml of Acrylic Acid (AA) (l) to NaOH solution(l) drop by drop in the ice bath.

3. Add the measured amount of Poly(Ethylene Glycol) Diacrylate (PEGDA) (l) to the neutralized solution.

3. Purge above aqueous phase by nitrogen gas (N_2) (g) for 30min.

4. Warm the water bath up to 60 ^{O}C.

5. Dissolve the measured amounts of Sorbitan Monooleate (Span 80) (l) in the 150ml of Cyclohexane in the 500ml of a round-type reactor.

6. Connect the reactor to the stirring system with agitation at 300 rpm and immerse it in the water bath.

7. After purging by N_2, add the measured amount of Sodium Persulfate (SPS) (s) to the aqueous phase and pour it into the oil phase.

8. Add the aqueous phase in the reactor through a neck drop by drop and start the polymerization.

9. After 3 hrs, turn off the hot plate, N_2 (g), and the stirring system to stop the polymerization.

10. Pour the polymerized solution into excessive methanol with the agitation by a magnetic bar in the ice bath.

11. Dewater and precipitate the polymer in the solution by methanol for 30min.

9. Filter the solution and get the polymers

10. Dry the samples in the vacuum and put it in the warm oven.