

Procedures for Phenol Formaldehyde Polymers

Novolac resin

1. Dissolve phenol crystals in formaldehyde and acetic acid. You need 20g formaldehyde, 25g phenol and 55ml acetic acid. Reduce quantities accordingly to make 50 ml solution of these components. Stir well.
2. In the 50ml solution, while stirring, add about 10ml of concentrated HCl.
3. After about 10-15 mins stirring, a white turbid solution is formed. This transition from a clear to turbid solution is spontaneous and hence quite dramatic. HINT: As you are stirring, you will also notice that the beaker gets warmer. This is an indication of the reaction moving forward and that the turbidity will appear shortly.
4. Continue stirring till a pink precipitate (polymer) sticks to the glass stirring rod.

NOTES:

- a. Addition of acetic acid is mainly to reduce the speed of the reaction. If you were to add a similar amount of HCl instead of acetic acid (not advisable), the reaction occurs instantly.
- b. If the solution does not change color after a long time, you may add a few more ml of conc. HCl. The reaction is faster as the media becomes more acidic.
- c. Due to use of acetic acid, a strong vinegar smell is associated with this experiment.

Resole resin

- 1) Dissolve phenol crystals in formaldehyde (formaldehyde to phenol ~ 1.5 ratio) (4 gm phenol, 6-10 grams phenol formaldehyde)
- 2) Dissolve NaOH in water (concentrated). Add ~ 10ml.
- 3) Combine two solutions into a test tube and bring to a boil.

NOTE: Make sure you only have a little quantity of the solution in the test tube for safety reasons.

SAFETY: Be careful while boiling as there is a tendency for the boiling water to squirt out.

- 4) Solution will turn brown then orange. Finally a pink/white precipitate will form on the sides of the vessel.