Answer on Question#50463-Chemistry-Organic Chemistry

why osmotic pressure is used to determine molar mass of macromolecule?

Solution.

Osmotic pressure does not depend on molar mass and only depend on concentration of dissolved substances. Exclusions of this rule are observed when dissolved molecules interact with one other. In dilute solution macromolecules of polymers usually take the form of globule and do no interact with each other (or such interaction is weak), so dilute solutions of macromolecules may be considered as true solution and osmotic pressure is proportional to concentration of macromolecules:

$$\pi = cRT$$

So, knowing of mass of dissolved macromolecules and osmotic pressure of solution allow to determine molar mass of macromolecules. In concentrated solutions macromolecules begin to interact with one other and osmotic pressure become non-proportional to concentration.

Answer: dilute solutions of macromolecules are true solutions, so osmotic pressure of such solutions is proportional to concentration. Knowing of sample's weight and concentration allow to determine molar mass of macromolecules.