Introduction to Materials Science and Engineering
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Lecture – 41
Copolymers

The polymers which we have discussed who are made up of only one kind of monomers, but there are also polymers which can be made, with more than one different kinds of monomers such polymers are called copolymers.

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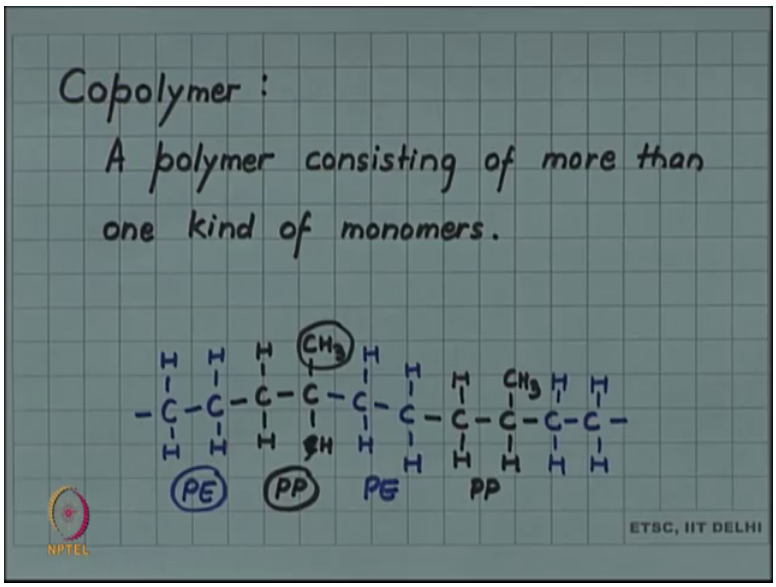

So, copolymer is a polymer consisting of more than one kind of monomer, a simple example I have drawn here that you have a monomer of polyethylene PE, but the next monomer is of poly propylene because it has that CH 3 side group, then again you have again you have polyethylene and then polypropylene.

So, in the same chain you can have monomer of polyethylene and polypropylene. So, this will be a copolymer of polyethylene and poly propylene. We have discussed solid solutions in metals. So, these copolymers are something like solid solution analog in metallic solid solutions, we here, we have the Copolymers.

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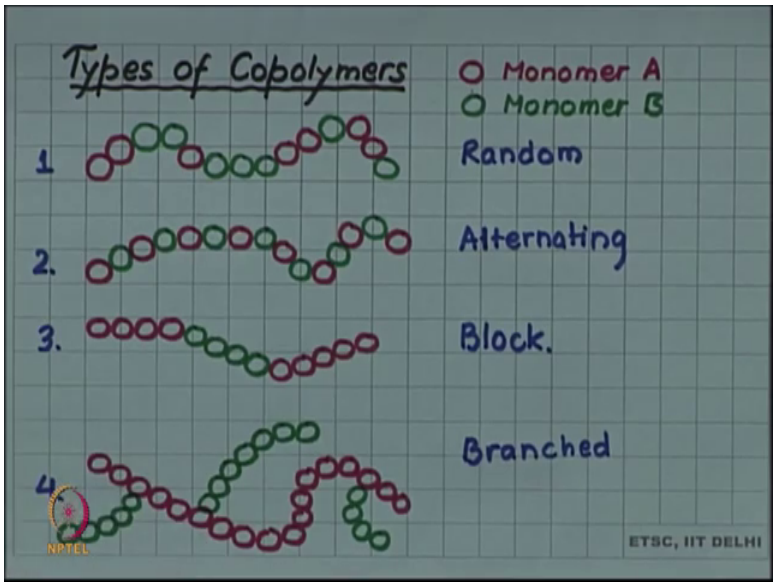

Here I am drawing different kinds of copolymers, by not drawing the actual writing down the full molecule, but just assuming one circle representing monomer of one type, the red circles representing the monomer of one type, and the green circle representing the monomer of another type.

So, if you have these monomers coming in short units. So, you have say example AA then BB A BB B and so on then this kind of the first type is called a random copolymer, but if the monomers are alternating AB, AB, AB this is called an alternating copolymer, if you have large blocks of A monomer, and then followed by B monomers, and then a monomers then this is called a block copolymer. And here you can see that A is forming a continuous chain, in which B is appearing as branches this is called a branched copolymer.

So, random copolymer alternating copolymer block copolymer and branched copolymer all these different varieties are possible for copolymers, you can think of alternating copolymer as an ordered solid solution this is an analogue of ordered solid solution whereas, random copolymer is an analogue of a disordered solid solution, which we discussed in the case of metals.