

1) The nylon has a peak around 1600 due to a carbonyl group in the amide linkage which shows the successful synthesis of nylon from hexamethyl diamine

2) Adipoyl chloride given mass: 3g
Molar mass: 183.03 g/mol

Hexamethyl diamine given mass: 4.7 g
Molar mass: 116.21 g/mol

$n = \frac{m}{Mr}$

moles of Adipoyl chloride = $\frac{3}{183.03} = 0.0164$

moles of Hexamethyl diamine = $\frac{4.7}{116.21} = 0.0404$

Since their molar Ratio is 1:1

Hexamethyl diamine is in excess while Adipoyl chloride is a limiting reagent

3) The hydrogen bonds between N-H bond of one nylon chain and C=O bond of another nylon chain provide the main intermolecular force. This makes nylon stronger and durable. This is the reason behind nylon's high boiling point.

4) Step Growth / condensation polymerisation is used during the synthesis of nylon. The monomers are Hexane 1,6 diamine and Adipoyl Chloride and HCl is lost during the synthesis.

5) a) Synthetic polymers are all around us, from nylon clothing to silicon heart valves, we use synthetic polymers do

a) Synthetic polymers are all around us, from plastic cups to biodegradable materials they are used in various fields.

Nylon is specially used in textile due to its strength and elasticity.

b) PSCs (Polymer solar cells) can be used as light absorbers, electron donor and acceptor can be used to produce clean energy from the sunlight with an efficiency of 10%. By working more on this field, we can increase the efficiency and it might be the solution of our energy crises.