Catch Them Before They Run Away: Polymerization Reagents & Reactions

Polymerization is a chemical reaction in which many small molecules (monomers) join together to form a larger molecule (polymers). Often the reaction produces heat and pressure. Industry carries out these processes under closely monitored conditions. Other chemicals (catalysts and inhibitors) and controlled amounts of heat, light and pressure are also involved.

What is vigorous polymerization?

Vigorous polymerization is potentially hazardous because the reaction may get out of control. Once started, the reaction is accelerated by the heat that it produces. The uncontrolled buildup of heat and pressure can cause a fire or an explosion, or can rupture closed containers. Depending on the material, temperature increases, sunlight, ultraviolet (UV) radiation, X-rays or contact with incompatible chemicals can trigger such reactions.

What is an inhibitor?

An inhibitor is a chemical that is added to a material to slow down or prevent an unwanted reaction such as polymerization. Inhibitors are added to many materials that can polymerize easily when they are pure.

Inhibitor levels in materials may gradually decrease during storage even at recommended temperatures. At storage temperatures higher than recommended, inhibitor levels can decrease at a much faster rate. At temperatures lower than recommended, the inhibitors may separate out. This action can result in some part of the material having little or no inhibitor.

Some inhibitors need oxygen to work effectively. Chemical suppliers may recommend checking oxygen and inhibitor levels regularly in stored materials and adding more if levels are too low.

Other considerations.

Be aware of opening date, reactivity and storage conditions of all reagents to ensure safe handling and storage is implemented.