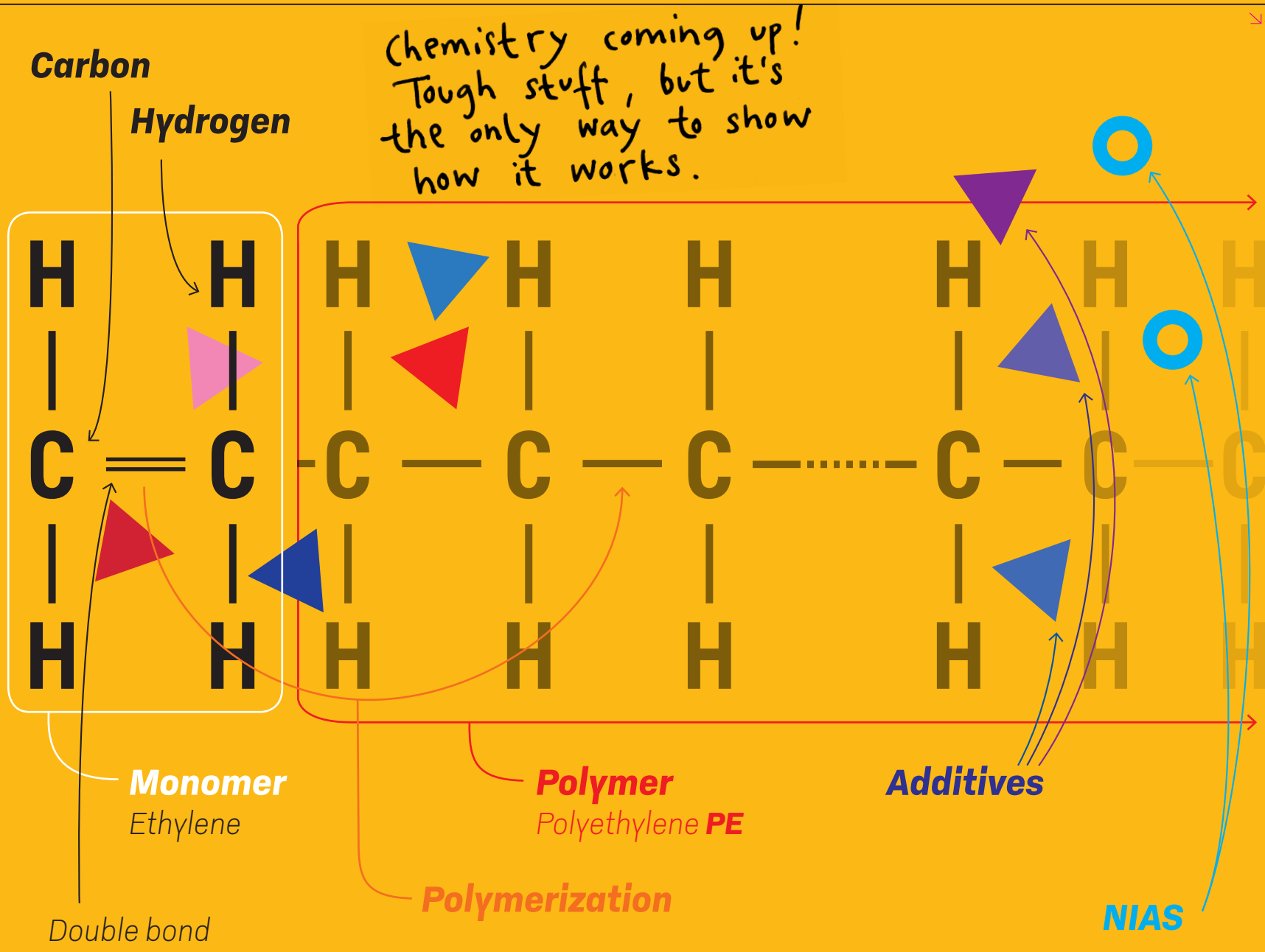
↘ **12** *HOW DO POLYMERS DIFFER?* ↘ **13** *WHAT ARE ADDITIVES?*



The Greek word ›plastikos‹, from which we have the English word ›plastic‹, means ›capable of being shaped or molded‹. Plastic is made from two chemical elements formed into a very long chain. One of them is ***carbon****, the basis of all life, which also occurs in natural gas and oil. We also know it as part of the gas called carbon dioxide, which is damaging the climate. Carbon is also found in coal, in graphite, and even in diamonds. In plastics, carbons bonds with* ***hydrogen****, the most common element in the entire universe.*

They form ethylene, which is a ***monomer****. In Greek, ›mono‹ means ›one‹, and ›méros‹ means ›part‹, so together they mean ›one part‹. Using an enormous amount of energy, the carbon-double bonds are opened and join together up to 10,000 times in a chain reaction to form a very long molecular chain, a* ***polymer****. This is called* ***polymerization*** *– ›poly‹ meaning ›many‹.*

Plastic is made up of polymers and other substances called ***additives****. Additives are embedded in plastics and dissolve out again easily. They are mobile. Some are intentionally added to the polymer to make the material more durable. All plastic unintentionally contains many other chemical substances that are either present in the source material or become embedded during the aggressive chemical process of polymerization. They are known as non-intentionally added substances, or* ***NIAS*** *for short.*