

SUPER GLUE

The amazing story of CA glue

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It's been used on elephant tusks, racing cars, space shuttles- even human wounds. It's cyanoacrylate, better known as superglue. Here's its story:

ACCIDENTAL INVENTION

Dr. Harry Coover was a researcher working for Kodak Research Labs in 1942. While trying to develop a clear plastic gun sight for use during World War II, he discovered something else: cyanoacrylates. But it was no good for what he needed — it stuck to everything, which created a huge mess. So he set it aside and moved on.

Nine years later Dr. Coover was working at the Tennessee Eastman Chemical Company. This time he was trying to find a tough polymer for jet canopies. While experimenting, he remembered the cyanoacrylate and wondered about its ability to refract light. A fellow researcher named (ironically) Dr. Fred Joyner spread a film of ethyl cyanoacrylate between two prisms of a refractometer. Not only did it not refract light, but it once again left a big sticky mess. And no matter how hard they tried, the two scientists couldn't pry the expensive prisms apart.

Embarrassed, they sheepishly told company execs about the ruined equipment. But instead of ridicule, they received praise — and orders to begin developing the adhesive for commercial use. Eastman Compound #910 hit the market in 1958, but initial sales were low.

Why? People didn't believe Eastman's claims about the glue. So to prove its worth, Dr. Coover appeared on the TV quiz show "I've Got a Secret" and lifted host Gary Moore completely off the floor... using only a single drop of the glue.

HOW IT WORKS

Here's how it works: Cyanoacrylate, CA for short, is a highly reactive liquid, and when left to its own devices will quickly solidify. The addition of an acid stabilizer prevents the CA from reacting and keeps it in a liquid state. When the acid stabilizer comes into contact with a catalyst, its stabilizing effect is neutralized. This allows the CA molecules to react with each other, forming long polymer chains. The catalyst for the acid stabilizer is hydroxyl ions, which are conveniently located in every molecule of water. So do you have to mix CA with water? No. Most surfaces already have a tiny bit of water on them. If they don't, there are always minuscule amounts of water available in the air. The water acts like a trigger, allowing the molecular structure of the CA to change. The molecules join up like a long series of popper beads. What was a thin liquid becomes a hard mass of molecular spaghetti noodles, bonding to whatever it contacts.

HELPFUL TIPS FOR USING SUPERGLUE

Make sure the parts being glued don't move at all during the formation of the chains. If so, the chain will break and the glue won't hold. A little dab'll do ya.

Superglue bonds best when it's used at the rate of one drop per square inch. More than that requires a much longer bonding period, which may result in a weaker bond. If you're gluing two flat surfaces together, rough

them up with sandpaper first. That'll give the glue more surface area to bond to. But make sure you blow off any dusty residue first. Glued your fingers together? Use nail polish remover. Don't have any? Try warm soapy water and a little patience. Your sweat and natural skin oils will soon loosen the bond.