

Secrets of the trade

Skateboarding

Jonathan Hare *investigates how chemistry revolutionised the sport*

Find out more

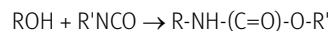
Watch some amazing skateboard videos, learn more about the science and technology of skating and make your own homemade skateboard speedometer at <http://bit.ly/12vaiZn>

The surfing craze of the 1940s and 50s led people to create 'land surfboards' to practice on when there was no wind or waves. These early skateboards were quite large, rather like the modern day longboards that seem to be undergoing a revival at the moment.

the essential interface between the road and the skater. In the early days, metal, rubber and even wooden wheels were used but they gave very poor performance and were dangerous (poor grip). Ideally, you need a material that is lightweight, extremely strong and durable, has good grip (wet or dry) and is easy and cheap to make.

Polyurethane (developed during the second world war) is now the material of choice for skating. It is an incredibly durable, rubbery material. Not only does it have all the advanced properties we need for skate wheels, but it can be manufactured in various hardnesses and mixed with pigments to create an amazing range of sizes, shapes and colours.

Polyurethane is a polymer composed of two types of monomer. One has two isocyanate functional groups (-NCO), the other has at least two hydroxyl groups (-OH). Using a suitable catalyst, these functional groups form urethane links (-NH-(C=O)-O-) which bind the monomers to create the long chain polymer:



where R and R' are alkyl or aryl groups.

Distance endurance

Recently, three of the world's best long distance skaters travelled 2000 km on longboards down the length of South America and in Morocco.

These long distance trips were made possible through polyurethane's great qualities. The skaters experienced driving rain and frost in Morocco's high Atlas mountains and in the Andes, they were 'boiled' (and frozen again) in the deserts. Although their decks and bearings struggled with the demands of the trip they had very little trouble with the wheels. The wheels coped with sub-zero temperatures on frozen roads and extremely high temperatures on melting tarmac desert roads. Metal wheels would cope with such extremes but they would not provide the essential traction or shock absorbing qualities of polyurethane. Old-style wood or leather wheels would simply have perished.

If you could wave a magic wand and wish for the perfect material for skateboard wheels it would be hard to better the fantastic properties of polyurethane!



Polyurethane is now the material of choice for skateboard wheels

Skateboards consist of: the deck (often made of maple, bamboo or metal alloy); the trucks (used to hold the wheels and to steer); and the wheels. Longboards are similar but have larger decks, trucks and wheels and are more suited to adults and long distance skating.

Wheel innovations

Being a fan of longboarding I started thinking about the science involved. I think the innovation and technical step-change that really gave us modern skateboarding was the development of the plastic wheel. The wheel is