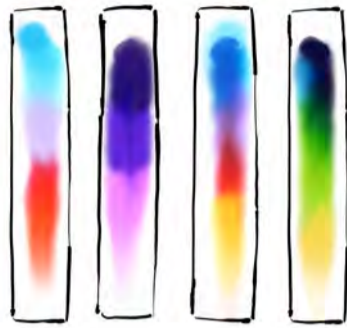


# INDUSTRIAL CHEMISTRY

## CHROMATOGRAPHY

Chromatography is invented by Mikhail Tsvet during research on plant pigments, now an indispensable technique in the separation and analysis of chemical mixtures.



**1891**

## THERMAL CRACKING

The first thermal cracking process for petroleum is patented by Vladimir Shukhov, a vital method for breaking down large hydrocarbons into smaller molecules for use across multiple industries



**1900**

**1907**

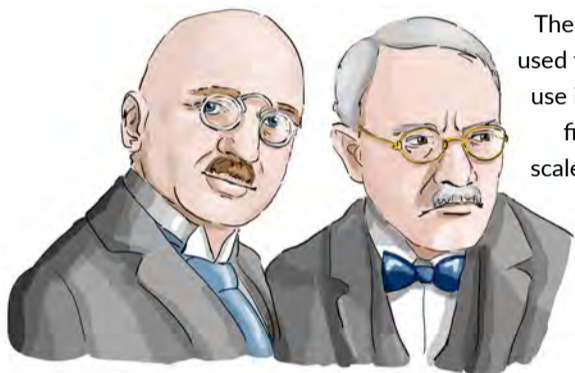
## SYNTHETIC PLASTIC

Bakelite is developed by Belgian-American chemist, Leo Baekeland, instigating the birth of the modern plastics industry.



## HABER BOSCH PROCESS

The Haber-Bosch process is used to produce ammonia for use in crop fertilisers for the first time on an industrial scale, expanding agricultural productivity to feed the world's population.



**1913**

**1935**

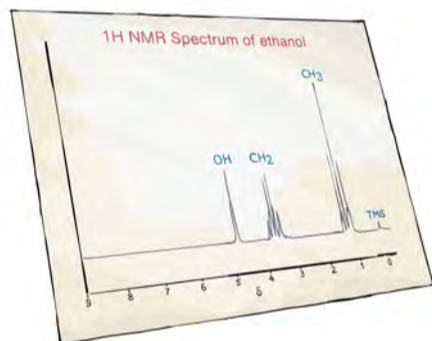
## SYNTHETIC POLYMERS

The first Nylon is produced by DuPont, going on to become one of the most commercially successful polymers of all time.



## NUCLEAR MAGNETIC RESONANCE

Nuclear magnetic resonance (NMR) is developed for use with solids and liquids, revolutionising molecular analysis by enabling structures to be identified within minutes.



**1946**

**1965**

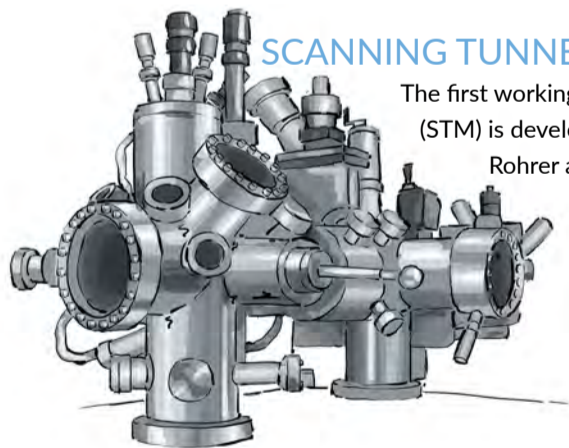
## KEVLAR

Kevlar is invented, a super-strong plastic able to withstand extreme temperatures, significantly enhancing armour, vehicle bodies and tyres.



## SCANNING TUNNELLING MICROSCOPE

The first working Scanning Tunnelling Microscope (STM) is developed by Gerd Binnig and Heinrich Rohrer at IBM Zurich, driving advances in nanotechnology by enabling the depiction of individual atoms.



**1981**

**1994**

## TOTAL SYNTHESIS OF TAXOL

The first total synthesis of highly effective cancer treatment, Taxol, is published by the Holton group at Florida State University, providing an industrial route for reproducing this complex natural product.



**2015**

## GRAPHENE

The National Graphene Institute opened at the University of Manchester to focus on the commercialisation of the world's first one atom thick, two-dimensional carbon material. Global demand for graphene is predicted to soar over the next decade.

