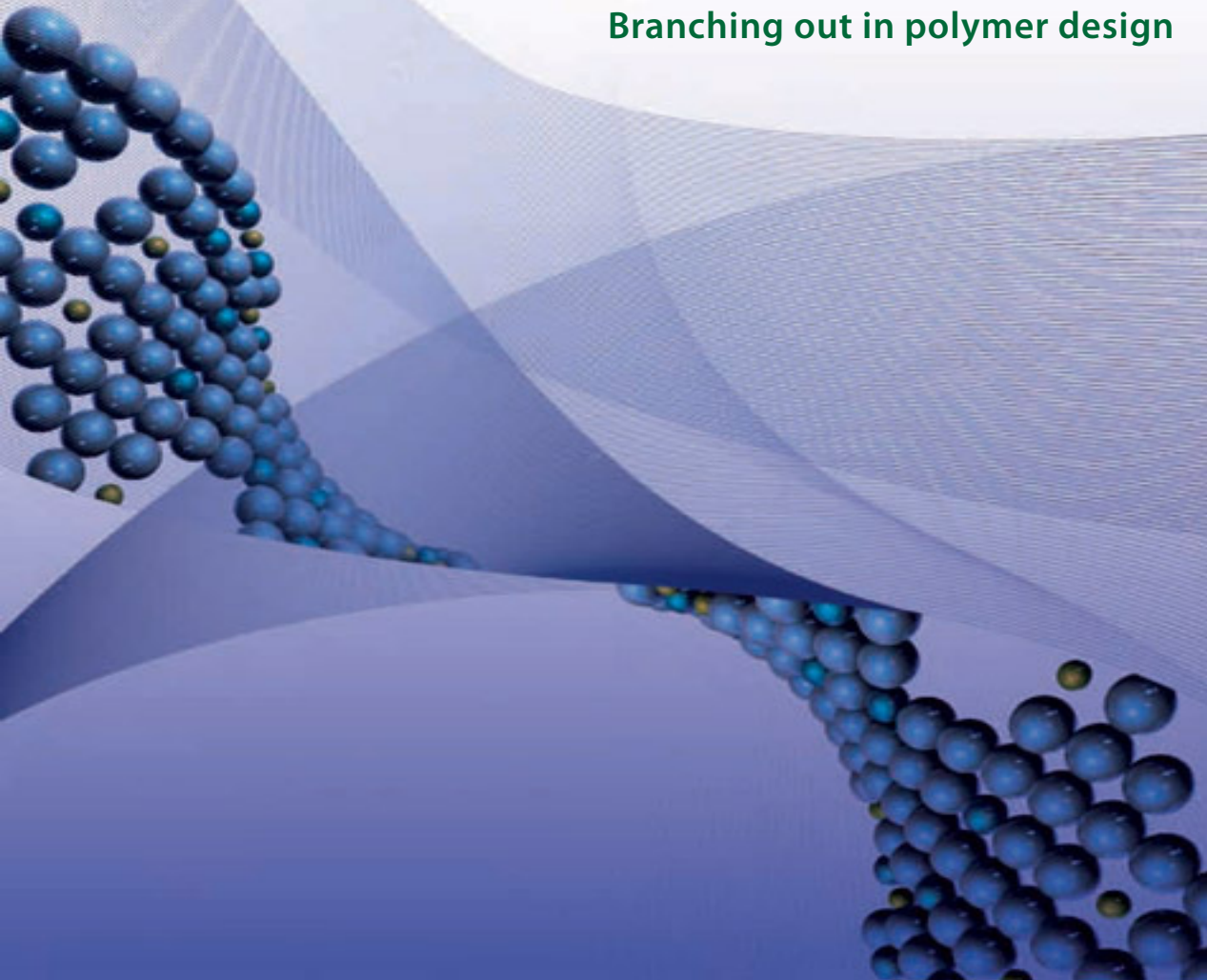




# HYDRA

POLYMERS

**Branching out in polymer design**



# Branching out in polymer design

Hydra Polymers Ltd was formed in 2007 and is based in Liverpool in the UK. The Company is a spin out from Unilever plc and is focused on providing products derived from unique polymer technology.

## Products & Applications

Hydra Polymers can provide novel polymeric materials for a wide range of applications, including **paints & coatings, inks, adhesives, fuel, lubricant additives, water treatment, agrochemicals and pharmaceuticals.**

Products include:

- ✓ High performance dispersants
- ✓ High solids/low VOC resins
- ✓ Viscosity reducing additives
- ✓ Efficient emulsifiers
- ✓ Responsive systems



## Versatility & Compatibility

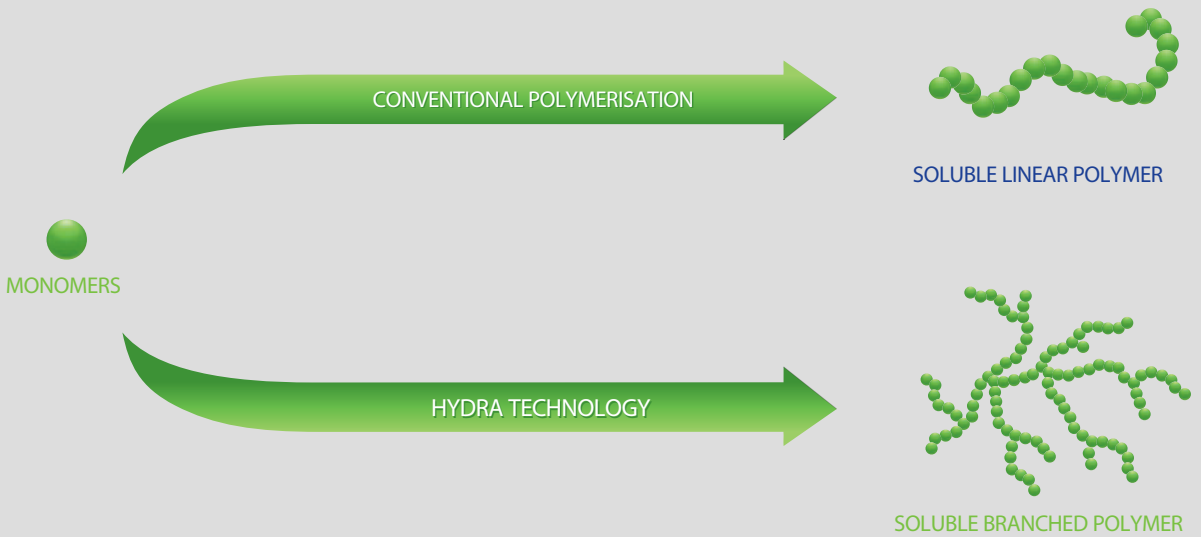
The Hydra technology is versatile and products can be designed to mimic commercially available materials ensuring compatibility with existing formulations and other resin types, but with the benefits of:

- Low viscosity
- High molecular weight
- High functionality
- High surface interaction
- Good compatibility & miscibility
- Polymers are REACH exempt

### Hydra Technology

The patent protected Hydra Technology is used to prepare novel polymeric structures. These materials can be designed to be comparable in composition to linear equivalents but their unique 3-dimensional architecture gives rise to enhanced functionality and performance.





## Key advantages compared to current linear polymers:

### Low Viscosity & High Molecular Weight

Hydra polymers exhibit lower solution viscosity than their linear analogues for similar molecular weights, as shown in Figure 1, opposite.

The polymers exhibit low solution and melt viscosities, even at high molecular weights, enabling high solids / low VOC formulations. The materials can be prepared up to extremely high molecular weights (up to 1 million Daltons).

### High Surface Interactions

The unique architecture allows many end groups to be designed into the polymer. This provides highly interactive materials which exhibit strong surface interactions, which are desirable in application that require good adhesion, such as highly effective dispersants.

The concentration of end groups is much higher than for linear counterparts making Hydra materials more efficient than comparable linear polymers.



Figure 1

### Comparison of viscosity versus solids for a Hydra and linear poly(butylmethacrylate)

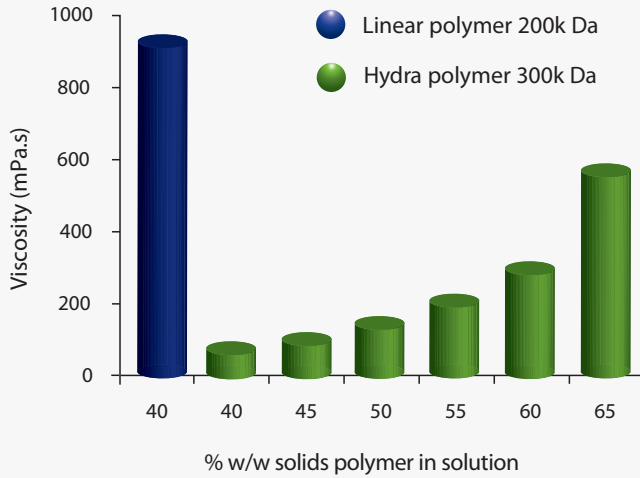
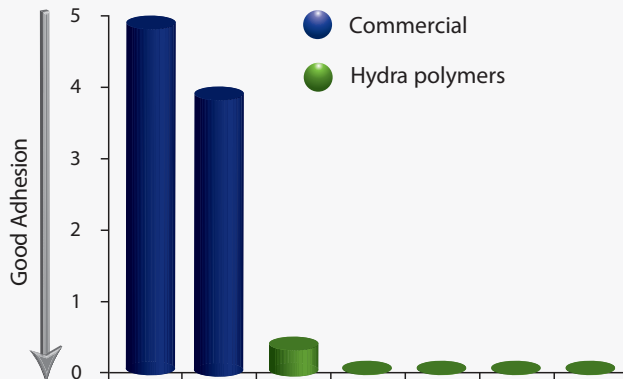


Figure 2

### Comparison of Adhesion



## Custom Design

Hydra Polymers can custom design unique materials to incorporate a range of chemical functionalities including acidic, basic, neutral, hydrophilic, hydrophobic and responsive moieties.



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POLYMERS

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