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# Safe and efficient synthesis of Ansa-Indenyl Catalysts

Cut out the BuLi and increase reliability

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## Step change in productivity for key polymer synthesis compounds

A University of Cambridge research team, with input from supply chain stakeholders, has developed a novel synthesis route to cyclopentadienyl compounds that eliminates the use of dangerous reagents all while improving process yields. Furthermore, they have developed a simple separation technique for the chiral metallocene catalysts used in polymer synthesis that enables further yield and efficiency savings.

Image credit: Polyethlyene beads © Luis Tgn

Bis-indenes are widely used in chemical synthesis, not least for their use as ligands for metallocene mediated polymerization of olefins. The use of these simple catalysts gives high levels of control and specificity that has enabled the widespread use of polymers in modern society. However, the synthesis of the ligands has long relied on inefficient and dangerous processes that require specialist equipment and controlled conditions, and this solution has the potential to change this.

### Commercial benefits

- ✓ **Reduction in production cost of polymer synthesis**
- ✓ **Decrease in use of specialised equipment**
- ✓ Faster extraction of chiral metallocene catalysts
- ✓ Increased **process reliability**

### Technical benefits

- Allows **butyl lithium free synthesis** route to cyclopentadiene compounds
- Gives **increased yield** over current industrial synthesis routes
- No need for dried solvents in synthesis

The principal users of this technology are chemical companies that make, or have manufactured, metallocene catalysts to produce olefin polymers.

Olefin polymers account for 46% of worldwide polymer production, of which a significant proportion employ cyclopentadienyl catalysts.

Our new synthesis route will give a metallocene or ligand supplier a distinct competitive advantage in the marketplace, allowing for more efficient and safer production at a much lower cost.

Professor Dominic Wright has been at the Yusuf Hamied Department of Chemistry for over 30 years. His research interests include the development of new, well-defined synthetic routes to a broad range of main group and transition metal compounds, many of which have been almost unexplored previously.

**For further information please contact:**

Jennie Flint
jennie.flint@enterprise.cam.ac.uk
01223 765035

www.enterprise.cam.ac.uk