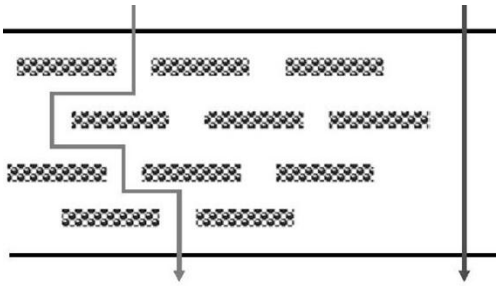
# Enhanced Gas Barrier Layer Technology

## The Challenge

Improve the shelf life of polymer based beverage containers.

A common technique for preventing transmission of gas through a membrane is by the torturous path method. Typically platelets are embedded in the polymers to reduce the permeability. The size and shape of the platelets affects the performance; high aspect ratio (very thin, large area) platelets provide the best solution.



## Proposed Solution

The Coleman group in TCD has recently made a major breakthrough in the manufacture of high aspect platelets. They have developed a robust, cost effective process to manufacture large quantities of the thinnest possible platelets – "one atom in thickness". Suitable materials such as Graphene (black in colour) or Boron Nitride (white in colour) are currently being manufactured and tested in CRANN. As well as making a stronger and lighter composite, these materials increase the length of the tortuous path, thereby improving the gas barrier properties.

## Next Step

TCD are seeking a development partner to support further testing and production scale up. This includes developing the polymer-Graphene matrix, investigating composite fabrication and testing the gas barrier properties.

## Contact Information

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**Inventor: - Prof Jonathan Coleman:** is the head of the Chemical Physics of Low-Dimensional Nanostructures group. The main materials studied are polymers, carbon nanotubes, inorganic nanowires and graphite. A recent high impact publication in Science demonstrated large scale exfoliation of Graphene, Boron Nitride, Molybdenum Disulfide as well as a range of other layered materials.

**CRANN** - is a nano research institute within Trinity College Dublin. We are focused on producing and commercialising world-class research. We are deeply integrated with industry and have ongoing collaborations with large multinationals and small to medium local enterprise. The 250 strong research team is involved right across the spectrum from materials, magnetics, energy and drug development right thorough to product development of medical devices, sensors and integrated circuits. This work is supported by our state of the art Advanced Microscopy Laboratory.

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