

# Graphene: super-material goes super-permeable essay examples

[Environment](#), [Water](#)



**Q. What type of chemical bond do you believe connects the atoms of Graphene? Why?**

A. A Graphene sheet is essentially a one layer thick graphite structure, an allotrope of carbon that forms hexagonal rings. The bonding in atoms of Graphene is essentially a covalent bond between carbon atoms. Each of the carbon atoms present in Graphene shares its valence electrons with three other carbon atoms forming a triple directional bond pattern on each carbon atom. This creates hexagonal ring like structures that constitute the two dimensional lattice of Graphene.

Q. Based on what you have learned in this chapter about the properties of water, why is that water is able to permeate " pass through" Graphene?

A. An explanation of the unique ability of water molecules to “ pass through” Graphene may lie in the property of water molecule. A unique property of water molecules is that it forms great cohesive film of water molecules in between Graphene layers, owing to the hydrogen bonding between an oxygen atom of one water molecule with a hydrogen atom of another water molecule. This hydrogen bonding, coupled with its small size, helps water molecules to permeate Graphene. Graphene layers constrict or get clogged with water molecules when any other molecule tries to permeate through.

Q. Considering what you have learned in this article about the properties of Graphene, how would it be useful in the use of the organic compound carbohydrate?

A. Graphene has the unique ability to allow water molecules to permeate through, while virtually restricting flow of all other molecules completely.

This property of Graphene can be used in processes like Dehydration

Synthesis and Hydrolysis of carbohydrates. Water removal or addition is important to allow such reactions to occur in the desired direction. Removing water lowers the concentration of products, forcing the reaction to occur in the forward direction. Dehydration Synthesis is a process involving synthesis of larger molecules from smaller ones and removal of water. Graphene can be used to contain the carbohydrate so produced, allowing water to permeate out facilitating forward reaction. A similar use of Graphene sheet can be done in the reverse process of Hydrolysis, where water needs to be added to help break down larger carbohydrate molecules into smaller ones.