

# **Graphene's Application to Boiler's Fabrication and Design**

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**ABSTRACT— Problem Statement:** Boilers have enormous applications and usefulness in power generation. It is to be reckoned as an all time employee in power generation sector and it is a device to create steam by applying heat energy to the water. It can also be used as steam generators. The pressure vessel of a boiler usually made of steel (or alloy steel), or historically of wrought iron is extremely exposed to the corrosion and embrittlement. This causes additional problems like boiler breakdown which can cost thousands of dollars in equipment repairs, as well as hundreds of thousands of dollars for additional property damage and business income losses. Despite numerous methods to minimize this problem the world hasn't come up with a concrete solution. Still today boiler accidents cause heavy economic and personal losses. Can we ever come up with a solution to almost nullify this problem with all the advancements in Material Sciences in recent years?

**Proposed Solution:** We aim at coating the inner side of boiler with deposition of membrane of oxide of recently discovered super-material graphene. Researchers found that a multilayer of graphene dioxide when stacked up together act as perfect molecular sieves when immersed in water, blocking all molecules or ions with a hydrated size larger than 4.5 Å. Caustic Embrittlement causing prime agent NaOH clearly is not contained within limits described in its molecular form. Also we found that except for water vapors it does not allow any other gas to bypass it hence we ideate that prime corrosion causing agents like dissolved O<sub>2</sub> and CO<sub>2</sub> will not interact with boiler material and hence will significantly remove boiler corrosion.

**Conclusion:** Incorporating this hypotheses we tend to believe that prime boiler enemies will exert their least presence on boiler's functioning and its life. Its working life will be enhanced by several times. We believe that use of the latest advancement with a rather primitive subject of boilers will create a wave within boiler industries and help them to enhance boilers working and increase its life. Also it will eliminate the causticity of boiler water.

**Keywords—** Boilers, Graphene, Graphene Oxide, Applied Sciences Corrosion, Embrittlement, Material Science.