

## Editorial Note on Non-metallic Materials

Sathvik Arava\*

Department of Modern Chemistry, Acharya Nagarjuna University, Guntur, India

### EDITORIAL

Non-metallic materials (polymers and composites) play a major role in oil and gas production as material options for reducing corrosion failures, weight, and costs. These materials have been widely used for decades and have the potential to expand in both new projects and refurbishment of existing facilities. Non-metal materials such as metal have advantages and limitations. Corrosion resistance and light weight are the most attractive properties, but their limited mechanical properties, heat resistance, and chemical resistance are still distracting features, limiting their widespread use and acceptance. Due to the lack of common design data and models to predict the long-term behaviour of these materials, the development of high quality materials to increase cost competitiveness with corrosion resistant alloys has not progressed. This chapter describes the mechanical and chemical properties of these materials, product forms, applications, and limitations, successes, data limitations, examples of failure mechanisms, and future uses for these materials. Focus on your needs.

If necessary, non-metal materials, especially plastics, should be degreased with an aqueous cleaning solution, then rinsed thoroughly with clean water and dried. Detergent can be replaced with solvent. Both solvent and cleaning solutions can remove mold release agents or waxes from the surface of plastic parts. If a treatment technique such as plasma treatment thoroughly cleans the surface along with surface modification, no chemical surface cleaning step is required.

Many non-metallic materials such as corrugated cardboard, cork, elastomers and graphite are used for the seals. The first two,

cardboard and cork, are rare in the process industry. The majority of non-metal sealants used in the process industry come from the family of elastomers and graphite. These are commonly referred to as soft seals or cut seals because they are cut from sheet metal. They can be easily compressed with a low screw load. Generally, these seals are used for low pressure class ASME150 and ASME300, and in some cases for medium pressure class ASME600. Depending on the type of elastomer, it can be used at temperatures up to 200°C. Graphite seals are suitable for temperatures up to 1022°F (550°C).

Most non-metallic materials in the industry can absorb a controlled amount of heat at a particular point without damaging adjacent parts. Built as part of process heating and manufacturing machines, the dielectric heating system meets many of the requirements for mass production while increasing product design and surface diversity. You may need uniform moisture across the width of the board, such as when the paper or board dries. Dielectric heating is particularly well suited for these requirements. Microwave heating to cure molded rubber parts, d. NS. Tires cause a significant reduction in rejection. Such industrial heaters use frequencies of 2.45 GHz and 915 MHz. Several microwave generators, each with an output of 25 kW, are used in industrial applications. To maximize the safety of the system operator, the structure of the heating furnace and microwave generator must be tightly controlled. Non-metal conductor many non-metal materials are cathodes for metals and alloys. For example, impermeable graphite used in heat exchange applications is noble to more active metals. The properties of non-metal conductors need to be known before use. Zinc coating is an example of a victim type. Nickel, silver, copper, lead and chrome are known as precious metal coatings.

**Correspondence to:** Sathvik Arava, Department of Modern Chemistry, Acharya Nagarjuna University, Guntur, Andhra Pradesh, India, Tel: +32-466-90-04-51; E-mail: sathvikraj38@gmail.com

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