

Environmentally Friendly Gel and it's Uses

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Abstract: *This paper discusses the uses of cobalt chloride added to silica gel and desiccant silica gel, specifically used in transformers as breathers. After much research, it is determined that desiccant silica gel is healthy for the environment because it can gather harmful products and neutralize them.*

Keywords: Cobalt chloride, Silica gel, Desiccant, Transformers, Environment

1. Introduction

It is determined that desiccant silica gel is safe for use in the environment and for several diverse uses, only one of which is used in electrical transformers as breathers. In its capacity, the gel expands and contracts depending on the heat produced by the transformer. Silica gel keeps electrical companies in good working order because it helps equipment to have a longer life. It is also safe for other uses in the environment like helping clean harmful particles out of water and the air (Kam). It has a long history of use, going back to the First World War when its best usage was discovered to help provide better clean air for soldiers to breathe from while being exposed to poisonous gases in the war zone. However, there are new properties like activated alumina that are claiming some of the markets from silica gel. The real question should be which is better, desiccant silica gel or activated alumina. Research says both are equally viable and helpful to the environment.

2. Literature Review

Silica gel is used as electrical breathers to absorb moisture thereby keeping the apparatus dry. It absorbs both atmospheric and protects the transformer from the insulating oil's expansion and contraction (Bakshi). In other uses, silica gel can remove harmful products from water and air deactivating harmful properties. Some silica gel has a blue color and that indicates it contains cobalt chloride, which then makes it a carcinogenic product. Thus, silica gel can be both an advantageous product and a disadvantageous product for humans depending on its uses and what other chemicals with which it is mixed.

The use and purpose of silica gel in power systems is to protect it from moisture. SarhanBakshi defines one of the major uses of silica gel in power systems is to prevent moisture from getting into the electrical device. He says that once moisture gets inside an electrical transformer it "degrades the mineral oil's insulating properties as well as the cellulose insulation of the windings. Silica gel crystals and beads have a high capacity for drying air. They achieve this by eliminating moisture" (Bakshi, para.3). As it's commonly known when electricity and water mix, it can be dangerous.

Emilio Morales reports that transformers are the most expensive equipment an electrical company purchases so it is important that these be protected for as long as possible. Using silica gel breathers protects transformers by giving them a long useful span. Guarding the transformer against

temperature fluxing extends its life. Thus, by extending transformers' usefulness, they are cost - effective for electrical companies.

There are two distinct types of silica gels. One is desiccant and the other contains cobalt chloride. The desiccant type is orange in color and biodegradable and organic. The other silica gel is blue and contains cobalt chloride, which is considered hazardous and also considered a carcinogenic material. Desiccant silica gel can be recycled and returned to the same use while blue silica gel cannot be recycled. Depending on the chemical mixture, the breathers can either be helpful or hazardous to the environment (National Park Service).

3. Discussion

The use of silica gel in breathers for electrical transformers is both safe and unsafe for the environment. If the gel is mixed with blue cobalt chloride it is harmful to the environment. It cannot be recycled and returned to use. On the other hand, desiccant silica gel is environmentally safe and can be recycled and returned to use in another electrical transformer. Moreover, safe silica gel is excellent for gathering harmful particles from the atmosphere and water so that humans can have safe drinking water and clean air to breathe. Hence putting silica gel in water filters gathers unhealthy particles in the water and renders them harmless so that drinking water can be safe for users. It seems that silica gel has many astounding qualities and depending on what it is mixed with is what causes the danger for humans and the environment.

While cobalt chloride in silica gel has been discussed previously, a new alternative for silica gel as a breather is activated alumina. Many gel users are switching to alumina because of its usability "as an adsorbent, owing to its high porosity and surface area, has propelled it to the foreground of numerous uses" (Jalon para.1). Not only can alumina dry moisture, it has multiple uses. It can "be utilized to dry gases, Drying gases is frequently required for the safe transfer of volatile gases" (Jalon para.4). Like silica gel, it can gather pollutants from water and make water safe for drinking. It can be helpful in environmental cleanup because it gathers harmful pollutants and renders them unharmed. It dries out humid air, so it can be a safe alternative to silica gel.

4. Conclusion

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So, the question might be which is better for the environment, cobalt chloride in silica gel, silica gel desiccant, or activated alumina? The answer is quite clear, not cobalt chloride. Desiccant silica gel or activated alumina have the same properties so the choice would be up to the user.

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