Introduction

Calcium peroxide products are typically very fine powders. This allows their use in a variety of applications, including in toothpaste, for dough conditioning, and to make a slurry for injection in soil for groundwater remediation.

In other applications, however, the dust created by these fine powders causes some handling challenges. In these cases, a granular calcium peroxide product is highly desirable.

Properties

IXPER® 70C Calcium Peroxide Granules is a unique material offered by Solvay Chemicals, Inc. It is specifically designed to avoid the dust generated from handling other calcium peroxide products. It also has an extended oxygen release profile that surpasses several calcium peroxide powder grades as demonstrated in a study of a 1% suspension performed at Western Michigan University.
Applications of IXPER® 70C Calcium Peroxide Granules

Application Data Sheet

Slow Oxygen Release Profile of Calcium Peroxide (CaO₂) in Water
IXPER Products Outperform Competitor’s CaO₂

Please review the technical datasheet entitled “IXPER 70C Calcium Peroxide Granules Properties” for additional information about the properties of this product.

Applications

Soil and Groundwater Remediation
IXPER products can be used to cost-effectively accelerate the natural attenuation of contaminated soils. The capability of aerobic microbes to biologically degrade contaminants, such as petroleum hydrocarbons, can be limited by inadequate levels of oxygen. IXPER products offer a passive approach to aerobic bioremediation of target contaminants, ensuring that adequate oxygen is present over an extended period of time. Without this supplemental oxygen source, the degradation of contaminants may either stop or proceed by much slower anaerobic processes.

IXPER 70C Calcium Peroxide Granules is particularly suitable during the excavation of contaminated soil, where it is used to line pits before clean soil is introduced. It is also the product of choice in cases of ex-situ soil remediation, or for in-situ treatment of shallow contaminated soils.

A laboratory study done at Western Michigan University compared the performance of several calcium peroxide products for the degradation of diesel fuel in a silty clay loam. The soil contained 3.6% carbonates and had a pH of 7.9.
Analysis of Total Petroleum Hydrocarbons (TPH) over time showed that IXPER 70C Calcium Peroxide Granules outperformed the powder calcium peroxide grades. The results were significantly different after 30 weeks.

**Biodegradation of THP in Soil with CaO₂**
IXPER 70C Granules Outperforms CaO₂ powder

Additional information about the use of IXPER 70C Calcium Peroxide Granules in this application can be found in the technical datasheet entitled “IXPER 70C Calcium Peroxide Granules for Bioremediation”

**Bodies of Water**
IXPER 70C Calcium Peroxide Granules can be used to oxygenate the lower parts of artificial or natural lakes. Oxygen concentration near the bottom of lakes can be very low, and many methods of increasing dissolved oxygen are unsatisfactory, either because they require excessive agitation, which moves phosphates to the surface, or because they do not ensure sufficient oxygenation.

By sinking to the bottom and releasing oxygen over a period of time, IXPER 70C Calcium Peroxide Granules can provide a more satisfactory method of oxygenating the lower layers.
A well oxygenated body of water has many obvious advantages to the ecosystem such as a healthy environment for fish, elimination of unpleasant smell, and improvement in water clarity.

Phosphate immobilization is another crucial advantage of the use of inorganic peroxides in bodies of water and is covered by patents.

The use of IXPER 70C Calcium Peroxide Granules is particularly advantageous because the granules sink quickly to the sediment and are less easily washed away by water currents. The advantages of granules are many.

- Optimum phosphate immobilization, due to granules’ effect on sediment chemistry
- Longer lasting results.
- Difficult to re-suspend with mechanical activity, eliminating swings of anoxic conditions at bottom.
- Slow oxygen/peroxide release, providing a long lasting effect requiring less frequent applications.
- Released oxygen/peroxide undergo chemical reactions such as conversion of sulfides to sulfates.
- Increased dissolved oxygen enhances microbial activity leading to degradation of organic matter and reduced turbidity and odor.
- Polenhal immobilization of heavy metals.
Oil & Gas Applications
In this field, a polysaccharide polymer is often incorporated downhole to help in either fracturing the rock or to form a filter cake. After the polymer achieves its purpose, it must be degraded by a “breaker” to lower its viscosity so that it can be easily removed.

IXPER 70C Calcium Peroxide Granules has unique advantages in this field as the granules are more stable than the powder, allowing a greater retention of the active ingredient during the injection process. At the desired time, these products can be activated by the addition of an acid, or by other means, resulting in the generation of hydrogen peroxide, the actual oxidizing agent.

For additional information about this application, please consult the technical datasheet entitled “IXPER Products for Oil & Gas Applications”.

Soil Amendment
Low oxygen in soil is often generated by heavy rainfall or bad irrigation techniques. Soils that are low in organic matter are more difficult to aerate naturally, and crops growing at high temperatures have very high oxygen demand at the roots.

Under these conditions, the lack of enough oxygen reduces root growth and makes them more susceptible to attack by soil-borne pathogens. Lack of oxygen also enhances the growth of anaerobic bacteria which further exacerbates the situation. The result is stunted growth, poor yields, diseases, lack of seed germination, etc.

IXPER 70C Calcium Peroxide Granules can be used in agricultural, horticultural and forestry applications. The product slowly decomposes in the moist soil, generating oxygen and the corresponding hydroxide. This can have the following advantages.

- Modification of the soil’s biological activity:
  - Avoid anaerobic conditions.
  - Speed the aerobic biological activity at high moisture content.
  - Enhance enzyme diversity.
  - Increase total soil microbial population.

- Improvement of the hydraulic conductivity of the soil, allowing more efficient movement of oxygen and nutrients. This effect is especially useful in heavy soils.

- Easier water and nutrients absorption, allowing plants to use them more efficiently.

For additional information about this application, please review the technical datasheet entitled “IXPER Products for Soil Amendment”.
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