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Advanced Energy Minerals

Shaping the Future of High-Tech Manufacturing with High Purity Alumina

High Purity Alumina (HPA) is a highly adaptable aluminum-based compound renowned for its hardness, chemical stability, and electrical insulation. This makes it vital for various advanced technologies and manufacturing processes. HPA plays a crucial role in the production of synthetic sapphires, used in applications ranging from LED lights and semiconductor wafers to durable electronic device screens. An emerging application for HPA is in battery technology and energy storage, where HPA has demonstrated the ability to enhance capacity and durability. In all applications, the purity of alumina is paramount, as even minor impurities can significantly affect performance and reliability.

This is where Advanced Energy Minerals (AEM) distinguishes itself. The company is revolutionizing the ultra-pure aluminum derivatives manufacturing landscape through a unique production process and technology. Notably, AEM employs the patented Chlorine Leach Crystallization Purification (CLCP) process, producing one of the world's purest and most environmentally sustainable HPA products, tailored to diverse client requirements. AEM offers its HPA with unparalleled purity levels, reaching 99.999 percent or Five Nines, surpassing most global competitors whose purity levels typically reach 99.99 percent or Four Nines.

AEM's expertise extends beyond ultra-pure HPA production. They have designed their manufacturing facilities to offer high flexibility in product offerings. Presently, their portfolio encompasses three categories: alumina powders, alumina pucks, and aluminum chlorides, customized to meet the distinct needs of diverse clients, from renewable energy battery manufacturers to the defense and aerospace sectors. Collaborating closely with customers, the company leverages its strengths in research and development to customize products based on specific purity levels, particle sizes, and other material characteristics tailored to customer requirements.

> **We are by far and away the lowest carbon producer in the world and that speaks to the uniquely sustainable methods we've developed that separate our company from its competitors**

Another key differentiator is AEM's unique use of electricity and renewable energy. In an industry where high-carbon, energy-intensive processes are the norm, AEM's CLCP process achieves near-zero Scope 1 and Scope 2 emissions, a critical factor for customers aiming to reduce the supply chain's carbon footprint. With a carbon footprint of less than one ton of CO2 per ton of HPA, AEM significantly outperforms the industry average of 12-13 tons. For those familiar with the classification proposed by the Greenhouse Gas Protocol (GHG Protocol), AEM's sustainability profile is as follows: Scope 1 is 0.0 CO2 equ./Kg HPA, Scope 2 is 0.07 and Scope 3 is 0.7.

"We are by far the lowest carbon producer in the world, which underscores our uniquely sustainable methods, setting us apart from our competitors," says Mick Adams, CEO of AEM.

AEM safeguards its innovative edge with a robust intellectual property portfolio, including multiple patents protecting the intricacies of the CLCP process, known only to a select few and supported by substantial investments in research and development.

For customers in the battery technology sector, purity and sustainability are paramount concerns, exemplified by AEM's partnership with a some of the most advanced battery manufacturers. To enhance battery performance, these manufacturers initially sourced HPA from various suppliers, attempting to optimize their battery's electrolytes. However, impurities in the alumina hindered progress, compromising efficiency and reliability.

Seeking a solution, the developer turned to AEM. After rigorous testing, the results were staggering—AEM's HPA outperformed competitors, proving to be the missing piece in the developer's puzzle. Impressed by the superior quality and consistency, the developer designated AEM as their exclusive, pre-qualified alumina supplier. As the developer prepares to launch their groundbreaking battery, they anticipate a surge in demand. Collaborating with AEM's team to develop a customized product and production process, this customer envisions continued growth, both as a key supplier and business partner.

Needless to say, Advanced Energy Minerals is poised to lead the industry by combining technological expertise with a strong commitment to environmental sustainability and a customer-centric approach. As the HPA market anticipates robust growth, it serves as a beacon for the future of sustainable, high-tech manufacturing. EB

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The annual listing of 10 companies in Canada that are at the forefront of providing Climate Change solutions and impacting the marketplace