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Beneficiation of industrial materials using a tribo-electric belt separator

Triboelectric charging has been around for thousands of years. In ancient Greece, the triboelectric effect was observed in which small fibers of clothing material easily adhered and were difficult to remove from amber jewelry. By rubbing the fibers, it made the situation worse. Even during this age, people wondered about the effect. Next, in the 18th century, one of our nations cofounders, Benjamin Franklin, performed several experiments utilizing the phenomenon. Triboelectric charging is based on materials becoming electrostatically charged based on contact or friction from other particles. During this process, electrons from materials will jump from one material to another and therefore become charged via the triboelectric series. Recently, ST Equipment & Technology, LLC (STET) has developed a processing system based on tribo-electrostatic separation. This dry technology has been successfully proven at commercial levels in both the fly ash and minerals industry such as calcite/quartz, talc/magnesite, and barite/quartz separations. In contrast to other electrostatic separation processes that are typically limited to particles greater than 75µm in size, the triboelectric belt separator is ideally suited for separation of very fine (<1µm) to moderately coarse (500µm) particles with very high throughput. The high efficiency multi-stage separation through internal charging/recharging and recycle results in far superior separations that can be achieved with a conventional single-stage free-fall tribo-electrostatic separator. Recently, testing has indicated separation of proteins from other materials. This discussion will show how the technology works along with data indicating protein upgrades from several sources successfully tested at the laboratory and pilot plant scale.

Biography

Paul Miranda has over 15 years of experience in metallurgical, process engineering, analytical testing, and academics. Experienced and trained in hydrometallurgy, he has extensive experience in hydrometallurgy, flotation testing, gravity testing, magnetic separation, diagnostic leach testing, and other laboratory experience. He has extensive analytical training which includes scanning electron microscopy, inductively coupled plasma spectroscopy, atomic adsorption microscopy, x-ray diffractometry, carbon sulfur analysis, and x-ray fluorescence. During his academic research has worked and implemented novel fundamental research in arsenic and selenium remediation, metal recoveries using ion exchange technologies. He has been responsible for lab work, pilot plant work, research, process development, engineering design, start-up, operations, management and environmental affairs for hydrometallurgical plants for managing arsenic containing solutions. He has authored or co-authored several papers, presentations, and holds multiple patents.

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