Creating functional materials with intelligent compounding

STEER JAPAN

Although the word "extruder" may conjure up images of resin converting, India-based STEER's co-rotating twin-screw extruders are being used in the food and pharmaceutical industries, in addition to high-performance elastomers, nanocomposites, biopolymers derived from renewable resources, and biodegradable polymers. STEER JAPAN CORPORATION, established in July 2007 as the company's Japanese subsidiary, moved its Yokohama Technical Center to the German Industry Park in Yokohama, Japan, last July, and began proposing development projects and providing support services for prototyping and commercialization for customers in the plastic, rubber, food, nutraceutical, and pharmaceutical markets with the latest co-rotating twin-screw extruder "OMega30H" with ultra-deep channel and high-torque specifications, and intelligent compounding that utilizes more than 30 types of special elements.

Sustainable and durable advanced materials

Dr. Babu Padmanabhan, Founder, Managing Director & Chief Knowledge Officer of STEER Group, who used to live in Shibuya, Tokyo, Japan, gave a press conference last November at the Yokohama Technical Center, "CREATING ADVANCED MATERIALS USING THE POWER OF INTELLIGENT COMPOUNDING" and referred to STEER's future corporate mission.

Dr. Babu Padmanabhan

"In the past 50 to 100 years, materials that have never existed in the world have appeared and enriched our lives, but they have also placed various burdens on the environment. We would like to continue our journey to promote advanced materials that are not only durable but also more sustainable, using our technology, which we call 'intelligent compounding'."

Twin-screw extruder for continuous production as an alternative to batch-type extruders

Dr. Padmanabhan went on to quote Albert Einstein, "The true sign of intelligence is not knowledge but imagination," and explained the intelligent compounding that STEER advocates.

"Extruders are about action, but our competitors are focused on how to increase productivity. That is an important part of the extruder, but we design the extruder based on what we think we can do with it. We use our imagination and then focus on how to design the extruder to bring out the action and functionality and how to make something new."

Typically, functional materials are made in a continuous batch process, but with STEER's twin-screw extruder, hydrolysis and enzymatic reactions can be performed continuously to create functional materials. Therefore, STEER's business is not limited to the conversion of resins, but is also used in the production of food, pharmaceuticals, paint pigments, etc. STEER's main focus is on plastics, but the company is now incorporating food and pharmaceutical-related machinery into its business. For example, the company's technology is used in the production of bulk pharmaceuticals for the treatment of HIV (human immunodeficiency virus) and iron deficiency anemia.

OMega30H

Recycle used non-woven masks

The following updates were also announced.

One is a technology that converts glass fiber-reinforced PP material into plastic material that can be reused in-line.

The other is a technology that can produce pellets from used non-woven masks and medical drapes, which are generated in large quantities because of the coronavirus disaster, by feeding them directly into a device called "SAFEReCYCLER" without separating each material.

Study on the World's First Commercialization of Polycarbonate Resin Chemical Recycling

The Mitsubishi Chemical Group (the MCG Group) has started a study aimed at realizing a processing capacity of approximately 10,000 tons per year by 2030, seeking to commercialize the world's first chemical recycling by depolymerization of PC resin.

PC resin is an engineering plastic with excellent transparency, impact resistance, heat resistance, and dimensional stability, and is often used for automobile interior parts, headlamps, building materials, etc. Currently, it is common to recycle used PC resin through mechanical recycling, in which it is pulverized, melted, and then remolded. However, there is a problem of not being able to obtain recycled resin of sufficient quality if degraded or different resins are mixed in. In contrast, chemical recycling, in which used PC resin is depolymerized, returned to monomers, and then polymerized again, makes it possible to recycle a wider range of used PC resin into high-quality recycled PC resin.

The MCG Group will start deploying the high-value-added PC resin "XANTAR," from April 3, 2023, aiming to further strengthen its engineering plastics business.

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