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Arkema, Nexoon, 5M, and IRT M2P join forces to work on a project involving factory-manufactured modular constructions made from Elium® resin

Arkema, Nexoon, 5M, and IRT M2P join forces to develop a new concept for factory-manufactured “custom” constructions. Each partner will contribute its expertise and know-how in order to validate this innovative construction concept aimed at meeting the needs of individual or collective, high-end or social, housing and also commercial or industrial buildings.

The project designed and managed for many years by Nexoon, consists in the development of all types of construction using prefabricated composites. It also provides for the creation of three prototype houses, assembled in accordance with a highly innovative system developed by Nexoon.

This innovative composite construction concept meets market demand for more sustainable construction. It will promote building construction in areas where access to traditional construction materials, such as sand, cement and wood, is difficult. Also capable of being disassembled and transported, these constructions can be set up again in other areas.

In Europe, this innovative and high-quality construction method is aimed at a market for individual homes, buildings, public buildings, or other buildings, architecturally in line with increasingly demanding environmental requirements.

In emerging countries, the concept aims to meet the high demand for social housing that can be assembled in 24 hours in non-polluting worksite conditions and without any heavy labour. The materials defined in this framework are part of a circular economy approach, with regard to recyclability, while adhering to the applicable standards and regulations for construction.

Elium® thermoplastic resin, a product of Arkema's research, was selected for the manufacture of composite elements due to its unique properties, combining technical performance with polymer recyclability. Reinforced with glass fibers, this resin has mechanical characteristics that comply with construction normative requirements; it is also weatherproof, resistant to UV radiation and fire resistant. Its special characteristic, in comparison to other resins used in composites, is that it is 100% recyclable. Thus, at the end of their life, the composite elements can be recycled either mechanically or chemically.

The partners involved in this project have the expertise necessary for the various phases of the project from development to completion of the first units of this custom-made house, namely the following:

- NEXOON, a newly created start-up, is developing a highly innovative concept for the construction of composite housing through the assembly of elements obtained by pultrusion; concept already tested with wood construction
- Arkema produces Elium® thermoplastic resin and;

- 5M is an expert in the pultrusion technique for the manufacture of large-scale composite parts;
- IRT M2P is a centre of industrial development with the know-how and the equipment enabling the development of the pultrusion process, the production of the first sections and their characterization.

*A designer of materials and innovative solutions, **Arkema** shapes materials and creates new uses that accelerate customer performance. Our balanced business portfolio spans high-performance materials, industrial specialties and coating solutions. Our globally recognized brands are ranked among the leaders in the markets we serve. Reporting annual sales of €8.8 billion in 2018, we employ approximately 20,000 people worldwide and operate in close to 55 countries. We are committed to active engagement with all our stakeholders. Our research centers in North America, France and Asia concentrate on advances in bio-based products, new energies, water management, electronic solutions, lightweight materials and design, home efficiency and insulation. www.arkema.com*

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***Nexoon** is a designer of custom-made, innovative, patent-holding processes in construction assembly systems. Nexoon uses high-performance, environmentally friendly and 100% recyclable pultruded materials. Its headquarters are in Schindellegi (Switzerland) and its French subsidiary Nexoon SAS continues to innovate in process research and development.*

*The **5M s.r.o.** Company operates in the area of the development and manufacture of composite and sandwich materials and the manufacture of products for a wide variety of customers. We specialise in demanding applications and special products, for which the application of these types of materials is excellent. Thanks to our own research and development department, we have launched a number of new products and key innovations over the years. The customers for the products of the 5M s.r.o Company are manufacturers of space, aircraft, rail vehicles and their accessories, road vehicles, electrical equipment and components, sporting goods, trolley lines and construction companies.*

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***IRT M2P** (Technological Research Institute – Materials Metallurgy and Processes) accelerates innovation, develops key technologies and provides technological platforms (elaboration, surface treatments, composites materials and joining) for industrial companies. IRT M2P Composite Materials Department mainly focuses on the development of dry preforming processes, C-RTM process and pultrusion in order to industrialise large structural parts for high cadency markets.*

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