Company profile

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CMC Solutions

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CMC Solutions bvba was started early in 2007 with the support of Eli Lilly and Company to continue in a collaboration that had already started, when Ulf Tilstam worked for the Lilly Development Center in Belgium, the task of developing continuous processes for the manufacture of pharmaceutical active ingredients. CMC Solutions is a chemistry-based research company specializing in the design, synthesis, and development of organic compounds for pharmaceutical, agrochemical, and biotechnology industries. CMC Solutions is a privately owned and family financed company. As most of the reactors needed to fulfill the needs of our customers are not commercially available, we have set up our own workshop to build custom-made reactors for continuous processes. The application laboratory where the chemical processes are developed is situated in Louvain-la-Neuve in close proximity to the Catholic University UCL. The company has a very close collaboration with the Department of Organic Chemistry.

In the beginning, we were asked by our customers to evaluate almost any type of reaction for its suitability for continuous processing. At that time, low temperature organometallic reactions, lithium aluminum hydride reductions, aromatic nucleophilic reactions, or rearrangements were evaluated. Today, the trend from customers is in the direction to develop extreme reaction conditions for the selective synthesis of the wanted products. The extreme chemistry could be hazardous reagents such as diazomethane or hydrazoic acid. It can also be hazardous reaction conditions where the reagents are not stable and would give a runaway scenario in a batch reactor. But the main part of the chemistry is high temperature, high pressure reactions with temperatures up to 350°C and pressures above 20 bar as most reactions will be performed above the boiling point of the solvent. The customers are interested in the possibility to telescope a continuous process step with the next step using the same solvent. In most cases, it will be a low boiling solvent that is first

Figure 1 High pressure Isco syringe pumps from Teledyne.

Figure 2 A 1-l kilolab coiled stainless steel reactor.

used at high temperatures to increase the throughput of the first reaction as much as possible and to deliver a prepared solution for the next step that might be a batch process as a reduction in tetrahydrofuran.

Services

Based on our more than 20 years of experience in the development of chemical processes for the pharmaceutical industry, we have gathered a large network of collaboration partners. Based on our knowledge, we do process development for any type of chemistry in any type of reactor. We offer the synthesis of difficult to obtain organic compounds. We design a suitable reactor system for the process. We develop the chemistry in the reactor system and transfer the reactor system and the process to the client. If the project continues to be successful, together with our collaboration partners we would hope to achieve a scaled up version of the system to mass production size. We offer reaction conditions from -80°C to 400°C and pressures up to 150 bar in reactors made of glass only (pressure <20 bar), steel-braided PTFE (T_{max} 230°C), stainless steel, hastaloy, or tantalum. We offer reactor systems for homogeneous liquid and heterogeneous liquid-liquid and gas-liquid reactions as well as fixed bed reactors

Figure 3 A fixed bed reactor.

with heterogeneous catalytic systems. Lately we can offer reactor systems that can handle slurries, either slurries from start or slurries formed in the reaction. All reactor systems contain peripheral equipment as storage containers, pumps, gauges, as well as back pressure regulators and the reaction part as mixer (micro-mixer or T-joint), and reactor (tube, fixed bed or micro-channel reactors). All reactor systems are modular systems where each piece can be changed for a new reactor system. For most reactor systems we use the high pressure Isco syringe pumps from Teledyne (Figure 1). As an example of the type of reactors we have is a 1-l kilolab coiled stainless steel reactor, which can be seen in Figure 2. A fixed bed reactor is illustrated in Figure 3. This type of reactor is used for the generation of diazomethane.

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