Synthetic Membranes and Their Applications
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Membrane technology is becoming increasingly important in a wide range of industrial applications and emerging markets. Driven by significant progress in material science and engineering coupled with innovative module designs and process technology, synthetic membranes became an inherent part of our daily life. Well-known membrane applications include filtration of particles, colloids or molecules from liquids or gas streams; water purification; recovery of organic vapors in the petrochemical industry and medical applications like artificial kidneys or lungs. In times of limited or diminishing resources and constantly growing energy prices, the potential of synthetic membranes have the potential to save energy compared to established industrial processes, improve human health, and the possibility make paradigm-changing contributions to our future energy supply,   Still major challenges spanning fundamental design, manufacturing and operational performance of these materials present compelling challenges at the Frontier of Engineering.

Membranes are manufactured from all main classes of materials: polymers, ceramics and metals. Since each of these classes has its own terminology regarding membrane processing, mode of operation and performance degradation (fouling), the intention of the session is to introduce, compare and evaluate the specific properties and challenges of membranes by taking topics into account representing the current frontiers of synthetic membrane applications and performance metrics. The first speaker of the session will discuss the general principles of membrane technology as well as challenges associated with the manufacturing and industrial upscaling. Some of the main issues and outstanding barriers of membrane technology will be discussed in more detail within the context of three currently intense focus areas of membrane applications.