

# Design and Manufacture of Quick-Change End-Caps for a Chemical Vapor Deposition System for Synthesis of Carbon Nanotubes

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To synthesize carbon nanotubes in a chemical vapor deposition reactor, a sealed environment is necessary for high-temperature decomposition of a carbon source in the vapor phase. The current furnace utilizes a large quartz tube for which custom end-caps must be fabricated to operate the system. They have been designed to fit parameters such as size, temperature, and sealing quality. The end-caps will be easily installable, providing a vacuum-tight seal with chemically resistant O-rings. Stainless steel is the material of choice, as it exhibits good strength, corrosion resistance, and is suited for operation in elevated temperatures. Stock size and material waste was considered to minimize weight, reduce cost, and expedite machining. These features have been optimized to provide a compromise of feasibility and functionality. With its unique, effective, and scalable design, the assembly will function in the current setup, and could be modified and adopted in other high-temperature materials processing systems.