This thesis describes experimental investigation of thermal and combustion phenomena as well as structure for self-propagating combustion synthesis of porous Ni - Ti intermetallic aimed for structural biomedical application. The control parameters for the porosity distribution have been investigated experimentally through varying the preheat temperature, initial porosity, initial elemental particle size, and applied pressure during the fabrication process. Ni - Ti mixture is prepared from elemental powders of Ni and Ti. The mixture is pressed into solid cylindrical samples of 1.1 cm diameter and 2 â€” 3cm length, with initial porosity ranging from 30% to 42%. The samples are preheated to various initial temperatures and ignited from the top surface such that the flame propagates axially downwards. The flame images are recorded with a motion camera. An infrared sensor is used to record the temperature profile during the combustion process. The samples are then cut using a diamond saw in both longitudinal and traversal directions. Image analysis software is then used to analyze the porosity distribution in each sample.

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The public is welcome to attend.