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## PDMS laser thermal processing for fabrication of 3D micro structure

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In this article a new technique called selective laser baking (SLB) for fabrication of a 3D structure with polydimethylsiloxane (PDMS), for micro technology applications has been presented. If PDMS is baked, the curing procedure speeds up. To investigate this, three mixtures of PDMS with its hardener was prepared and put in an oven and baked in different temperatures. Figure 1 shows the diagram of curing time versus baking temperature. As shown in this figure, by increasing the temperature, the curing time decreases. To fabricate a part, PDMS portion is prepared. But before it is hardened in a few hours, as shown in figure 2, a CO<sub>2</sub> laser emission exposes desired locations on the surface of the mixture according to the pattern of the model which has been designed and sliced in computer. Absorption of the laser, heats up the exposed area. Increasing the temperature, accelerates the curing procedure and cause the PDMS mixture to be cured and hardened immediately. After this process, a new layer of PDMS mixture is deposited on the surface of the previous cured layer. The CO<sub>2</sub> laser, again selectively exposes this new layer according to the second slice of the model. The exposed area is cured again and attaches to the previous layer. This process is repeated until the whole model is fabricated. Different laser exposure parameters were used to have the best resolution in the 3D printed parts. After 3D printing, the printed parts are removed from the bath, cleaned with acetone and baked in the oven to complete the curing procedure.

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