WNF Research Activities : Microfabrication of Optical Components and Systems

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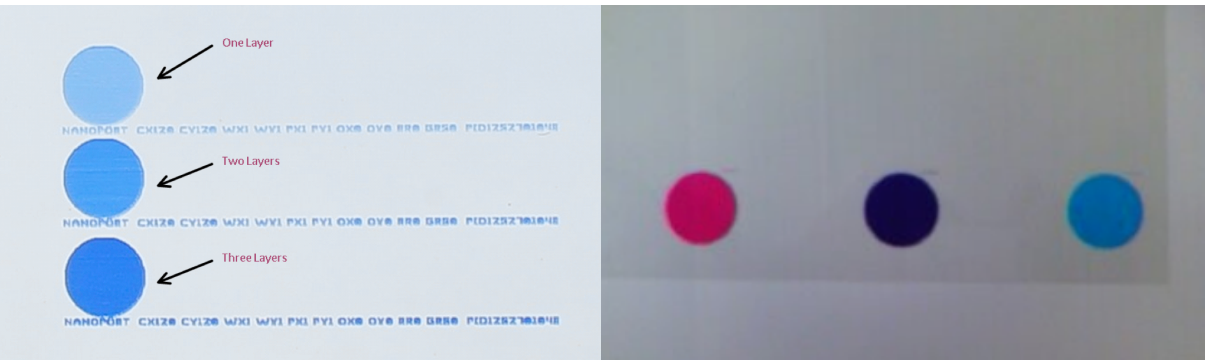
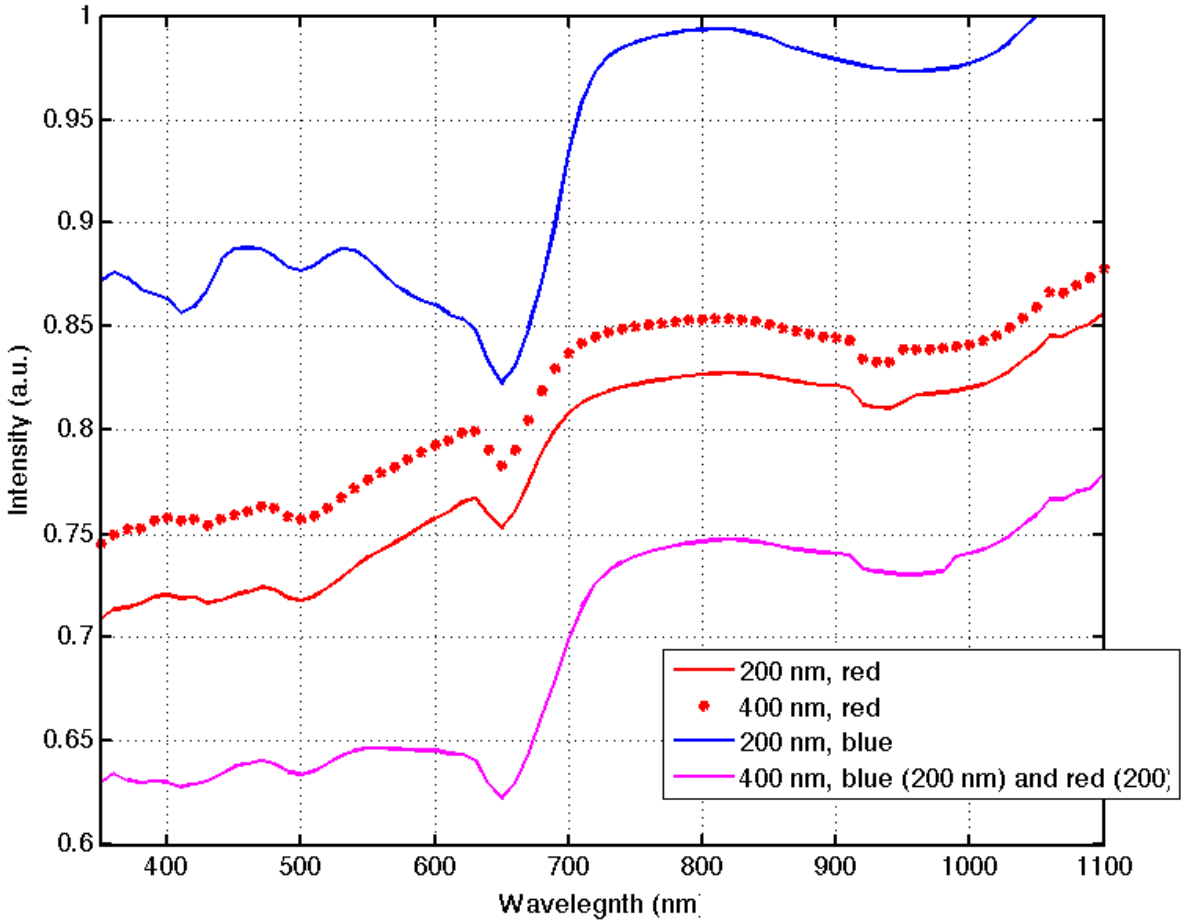
Investigation of Microfabricated Optical Thin Film Filters

Step one in reaching our goal of microfabricating optical systems on a chip (oSOC) is to demonstrate clean room fabrication of components such as filters. In this time period, we have identified a suitable substrate and a base material with other additives that will allow precise control of the filter properties through a simulation program. This program[1] is simultaneously being developed, tested against experimental results and refined to account for the micro scale physical effects. An example of an array of filters is shown in figure 1 taken through an optical microscope. On the left, the same filter material is used to vary the optical density using lithographic techniques. On the right side, different filter are fabricated on the same substrate. The visible transmission



properties of a filters fabricated at WNF are shown in Figure 2. A “red” filter is fabricated

[1] Key portions of the impact of optical micro density on the design of these filters are described in patent 8,075,942 titled “Microengineered optical filters that closely match predefined transmission curves and systems and methods of manufacture”



using one and two deposited layers. A “blue” layer is constructed using one deposition. Finally, the combination of red (2 layers) and blue (1 layer) transmission is shown.