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## PREPARATION AND OPTICAL PROPERTIES OF POLYMERIC NANO-PARTICLES MULTI-LAYER FILMS

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Three dimensional photonic crystals have some useful optical properties. Due to their periodic structure they are able to reflect light that matches their periodicity. Sandwiching these structures between multilayer polymer films modifies the optical properties of these crystals as compared with those of their single layer film. In this paper, the solutions of the polymers and nano-colloids in the corresponding solvent were casted using a specially designed spin-casting machine alternatively to produce a periodic structure. The optical properties of the cast film were studied using spectrophotometric technique. An opaque film of styrene-based nano opals has a blue-green reflection, whereas, sandwiching these particles between PS and PMMA layers, a red shift is observed and the multilayer structure represents a green color. Moreover,

sandwiching suspension between layers causes a restriction in reflecting wavelengths. This property makes these structures as good candidates in optical interferential filters applications