What is claimed is:

1. A method for controlling optical transmissivity of a polish pad material for use as a translucent chemical mechanical planarization top-pad (translucent CMP top-pad) for a chemical mechanical planarization pad, comprising:

adjusting a degree of crystallinity of the polish pad material based on a selection of polymer structures in chemical ingredients and casting controls to orient the polymer structures, the degree of crystallinity affecting light transmission and the optical transmissivity of the polish pad material;

pouring sub-pad material into a mold insert in a drum, the mold insert having a window mold;

centrifugal casting of the sub-pad material in the mold insert by rotating the drum, the centrifugal casting of the sub-pad material forming a chemical mechanical planarization sub-pad (CMP sub-pad) in a shape of the mold insert, the CMP sub-pad having a sub-pad window slot formed using the window mold;

pouring the polish pad material into the mold insert in the drum;

centrifugal casting of the polish pad material in the mold insert by rotating the drum using the casting controls, the centrifugal casting of the polish pad material forming the translucent CMP top-pad in the shape of the mold insert, the translucent CMP top-pad being transmissive to light and covering the sub-pad window slot;

tuning optical transmissivity of the translucent CMP top-pad by the adjusting of the degree of crystallinity of the polish pad material based on the selection of the polymer structures in the chemical ingredients and the casting controls to orient the polymer structures; and

wherein the sub-pad window slot and the translucent CMP top-pad covering the sub-pad window slot are used for optical endpoint detection of a polishing tool.

2. The method of claim 1, wherein the adjusting the degree of crystallinity of the polish pad material comprises at least one of

forming ordered, crystalline regions by reacting isocyanate and chain extension groups; and

forming soft, flexible regions by adding polyols.

3. The method of claim 1, wherein the polymer structures comprise at least one of chain length, degree of cross-linking, and presence of side groups.

4. The method of claim 1, further comprising mixing the chemical ingredients to result in an even dispersion within a mixture of the chemical ingredients.

5. The method of claim 4, further comprising at least one of controlling a first temperature of the chemical ingredients individually before the mixing and controlling a second temperature of the chemical ingredients during the mixing.

6. The method of claim 5, wherein the controlling of the at least one of the first temperature and the second temperature includes controlling a rate of temperature change.

7. The method of claim 1, further comprising adding a material with a lower density than the chemical ingredients to the chemical ingredients.

8. The method of claim 7, wherein the material with a lower density includes microspheres.

9. The method of claim 1, wherein the casting controls comprise at least one of a temperature and a pressure of the polish pad material during a casting operation.

10. The method of claim 9, wherein the casting controls include the temperature; and the temperature includes controlling a rate of cooling the polish pad material.

11. The method of claim 1, wherein the casting controls include centrifugal force from rotating the polish pad material in a cylinder, a thickness variation of the polish pad material being a function of centrifugal force from the rotating the polish pad material in the cylinder.

12. The method of claim 1, further comprising adjusting the degree of crystallinity of the polish pad material using curing controls, the curing controls comprising at least one of a time, a temperature, and a pressure of the polish pad material during curing.

13. The method of claim 12, wherein the temperature includes a rate of temperature change.

14. A method for controlling optical transmissivity of a chemical mechanical planarization top-pad (translucent CMP top-pad) for a chemical mechanical planarization pad, comprising:

adjusting a degree of crystallinity of a first polymer precursor based on a selection of polymer structures for the first polymer precursor;

arranging the first polymer precursor in a mold insert in a centrifugal caster for a chemical mechanical planarization sub-pad (CMP sub-pad), the mold insert having a window mold;

rotating the centrifugal caster to form the CMP sub-pad in a shape of the mold insert, the CMP sub-pad having a sub-pad window slot formed using the window mold;

adjusting a degree of crystallinity of a second polymer precursor based on a selection of polymer structures for the second polymer precursor, the degree of crystallinity affecting light transmission and optical transmissivity of the second polymer precursor;

arranging the second polymer precursor in the mold insert in the centrifugal caster for the translucent CMP top-pad;

rotating the centrifugal caster to form the translucent CMP top-pad in the shape of the mold insert, the translucent CMP top-pad being transmissive to light and covering the sub-pad window slot;

adjusting casting controls comprising at least one of a rate of cooling of the first and the second polymer precursors and a pressure of the first and the second polymer precursors during a casting operation to orient the polymer structures, the polymer structures comprising at least one of chain length, degree of cross-linking, and presence of side groups;

tuning optical transmissivity of the translucent CMP top-pad by the adjusting of casting controls; and

wherein the sub-pad window slot and the translucent CMP top-pad covering the sub-pad window slot are used for optical endpoint detection of a polishing tool.

15. The method of claim 14, further comprising forming at least one window in the CMP sub-pad to facilitate optical transmission of light through the translucent CMP top-pad using at least one of laser machining, punching, and mechanical machining.