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A Versatile Method for Covalent Layer by Layer Assembly of Thin Organic Films[1] HERNAN R. RENGIFO, Columbia University, CRISTIAN GRIGORAS, University of Pennsylvania, JEFFREY KOBERSTEIN, Columbia University — Layer by layer (LbL) assembly techniques construct multilayer thin films by sequential deposition of monomolecular layers of organic molecules. One of the drawbacks associated with their use is that monomolecular layers are usually held together by relatively weak forces such as Van der Waals, electrostatic and hydrogen bonding interactions, and can therefore be lacking in mechanical integrity. We demonstrate herein that heterobifunctional polymers, functionalized with one azide chain terminus and a protected alkyne group as the other chain terminus, constitute a powerful and versatile means for the covalent layer-by-layer (CLbL) assembly of thin polymer films. Each monomolecular polymer layer is covalently bound to both the preceding and following layers to produce a robust multilayer structure. Because the coupling chemistry used, "click" chemistry, is highly chemoselective, the layering process is virtually independent of the chemical nature of the polymer so that the constitution of each layer can be selected at will.

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