Combinatorial approach to organic optoelectronic materials made by PVD

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Abstract. A recently developed combinatorial method for fabrication and characterization of opto-electronic materials and devices made by physical vapor deposition (CPVD) is presented. The method takes advantage of angle-dependent evaporation rate from a Knüdsen source to create mono-dispersed, binary, and ternary thin film libraries whose thickness and/or stoichiometry change by two orders of magnitude along the library spatial coordinate. Thus far we have examined the influence of deposition rates on morphology of thin films grown by CPVD and the rate of Förster energy transfer in binary and ternary donor-acceptor mixtures. The later was used to optimize photoluminescence quantum efficiency and the color of new organic phosphors that will be used in solid state lighting applications.