The Use of Strongly Non-Equilibrium Processes in Magnetron Sputtering of Hard Protective Films

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Abstract. Magnetron sputtering involves highly non-equilibrium processes giving rise to non-equilibrium atomic-scale substitutes for high temperature, high pressure, and fast cooling at the growing film. I will discuss their physical principles and present estimates of their governing parameters, and I will illustrate them on three examples of alloy coatings containing high-temperature beta-phases, overstoichiometric nitrides, and superhard metallic coatings.