

LASER-ASSISTED ATOMIC LAYER DEPOSITION OF 2D METAL CHALCOGENIDE FILMS

ABSTRACT

Methods of forming 2D metal chalcogenide films using laser-assisted atomic layer deposition are disclosed. A direct-growth method includes: adhering a layer of metal-bearing molecules to the surface of a heated substrate; then reacting the layer of metal-bearing molecules with a chalcogenide-bearing radicalized precursor gas delivered using a plasma to form an amorphous 2D film of the metal chalcogenide; then laser annealing the amorphous 2D film to form a crystalline 2D film of the metal chalcogenide, which can have the form MX or MX_2 , where M is a metal and X is the chalcogenide. An indirect growth method that includes forming an MO_3 film is also disclosed.

FIG. 1