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(54) Title: INTEGRATED CIRCUIT DEVICE AND FABRICATION USING METAL-DOPED CHALCOGENIDE MATERIALS

(57) Abstract: Methods of forming metal-doped chalcogenide layers and devices containing such doped chalcogenide layers include using a plasma to induce diffusion of metal into a chalcogenide layer concurrently with metal deposition. The plasma contains at least one noble gas of low atomic weight, such as neon or helium. The plasma has a sputter yield sufficient to sputter a metal target and a UV component of its emitted spectrum sufficient to induce diffusion of the sputtered metal into the chalcogenide layer. Using such methods, a conductive layer can be formed on the doped chalcogenide layer (in situ.) In integrated circuit devices, such as non-volatile chalcogenide memory devices, doping of the chalcogenide layer concurrently with metal deposition and formation of a conductive layer (in situ) with the doping of the chalcogenide layer reduces contamination concerns and physical damage resulting from moving the device substrate from tool to tool, thus facilitating improved device reliability.a



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