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Dual-surfactant effect on enhancing Zn-Doping of GaP\(^1\) JUNYI ZHU, GERALD STRINGFELLOW, FENG LIU — We report first-principles calculations demonstrating a dual-surfactant effect of Sb and H on enhancing Zn-doping in vapor phase epitaxially grown GaP thin films. The combined effects of Sb and H lower significantly the doping energy of Zn in GaP, while neither Sb nor H can work alone as effectively. The role of H is to provide the extra electron accommodating the p-type dopant incorporation to satisfy the electron counting rule. Our finding has an important general implication that p-type doping in III-V thin films can be achieved by chemical deposition with H, but difficult by physical deposition without H.

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