Potential use of Hydride Vapour Phase Epitaxy for discrete and integrated photonic devices

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Abstract

Hydride vapour phase epitaxy is a near equilibrium technique is unique in its potential use for fabricating certain specific photonic devices. I will demonstrate its usefulness with specific examples such as buried heterostructure quantum cascade lasers (BH-QCL) including BH photonic crystal QCL in the MIR range, monolithically integrated InP based devices on InP and on silicon and InP/Si heterojunction for high efficiency solar cells. Some recent results on these devices/structures obtained in our laboratory will be presented. We are also starting to look at the orientation-patterned GaP layers for second harmonic generation.

Résumé

Sebastian Lourdudoss obtained M.Sc. in chemistry from (St. Joseph's College, Trichy) Madras University, India, in 1976 and Ph.D. in chemistry from Faculté Libre des Sciences de Lille, France, in 1979. In 1980 he joined KTH, Stockholm, Sweden, to work on chemical absorption heat pumps and thermochemical energy storage. He changed his field of interest to semiconductors in 1985 when he had moved to Swedish Institute of Microelectronics, where he started to develop epitaxy of compound semiconductors for fabricating optoelectronic devices. In 1993 he moved back to KTH where he is currently a professor in Semiconductor Materials and Head of Department of Materials and Nano Physics. He has contributed to the development of semi-insulating III-V materials including III-nitrides for discrete and/or integrated device fabrication and buried heterostructure lasers for high speed data- and telecom applications. His current interests are integration of III-Vs on silicon, high power buried heterostructure quantum cascade lasers and semiconductors for non-linear applications.