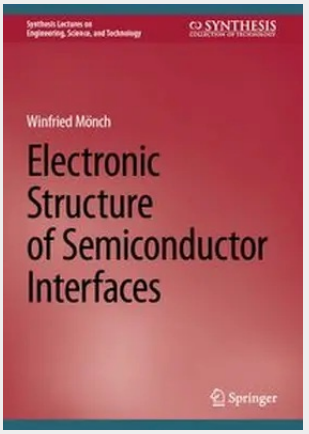
Mönch

Electronic Structure of Semiconductor Interfaces



This concise volume examines the characteristic electronic parameters of semiconductor interfaces, namely the barrier heights of metal–semiconductor or contacts and the valence-band discontinuities of semiconductor–semiconductor interfaces or heterostructures. Both are determined by the same concept, namely the wave-function tails of electron states overlapping a semiconductor band gap directly at the interface. These interface-induced gap states (IFIGS) result from the complex band structure of the corresponding semiconductor. The IFIGS are characterized by two parameters, namely by their branch point, at which their charge character changes from predominantly valence-band- to conduction-band-like, and secondly by the proportionality factor or slope parameter of the corresponding electric-dipole term, which varies in proportion to the difference in the electronegativities of the two solids forming the interface. This IFIGS-and-electronegativity concept consistently and quantitatively explains the experimentally observed barrier heights of contacts as well as the valence-band offsets of heterostructures. Insulators are treated as wide band-gap semiconductors.

This concise volume examines the characteristic electronic parameters of semiconductor interfaces, namely the barrier heights of metal–semiconductor or Schottky contacts and the valence-band discontinuities of semiconductor–semiconductor interfaces or heterostructures. Both are determined by the same concept, namely the wave-function tails of electron states overlapping a semiconductor band gap directly at the interface. These interface-induced gap states (IFIGS) result from the complex band structure of the corresponding semiconductor. The IFIGS are characterized by two parameters, namely by their branch point, at which their charge character changes from predominantly valence-band- to conduction-band-like, and secondly by the proportionality factor or slope parameter of the corresponding electric-dipole term, which varies in proportion to the difference in the electronegativities of the two solids forming the interface. This IFIGS-and-electronegativity concept consistently and quantitatively explains the experimentally observed barrier heights of Schottky contacts as well as the valence-band offsets of heterostructures. Insulators are treated as wide band-gap semiconductors.

149,79 €
139,99 € (zzgl. MwSt.)

Lieferfrist: bis zu 10 Tage

Artikelnummer: 9783031590634
Medium: Buch
ISBN: 978-3-031-59063-4
Verlag: Springer Nature Switzerland
Erscheinungstermin: 15.06.2024
Sprache(n): Englisch
Auflage: 2024
Serie: Synthesis Lectures on Engineering, Science, and Technology
Produktform: Gebunden
Gewicht: 488 g
Seiten: 150
Format (B x H): 173 x 246 mm

Kundenservice Verlag Dr. Otto Schmidt KG
Neumannstraße 10, 40235 Düsseldorf | kundenservice@otto-schmidt.de | 0221-93738-997 (Inland)