

الآية

قال تعالى:

{قُلْ لَّوْ كَانَ الْبَحْرُ مِدَادًا لِّكَلِمَاتِ رَبِّي لَنَفِدَ الْبَحْرُ
قَبْلَ أَنْ تَنفَدَ كَلِمَاتُ رَبِّي وَلَوْ جِئْنَا بِمِثْلِهِ مَدَدًا }.

صدق الله العظيم.

سورة الكهف الآية (١٠٩).

DEDICATION

I dedicate this thesis to my senior family for supporting me, to my mother for her patience and motivated me, to spirit my father and brother have always been role model, to my sisters, to all my colleagues and friends and my God bless you all.

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ABSTRACT

In this work the effect of some high work functions of metals on semiconductors have been investigated by using metal-semiconductor contacts technology. To enhancements the efficiency of the semiconductor. In generally, the values of Schottky barrier height Φ_B and built in potential V_{bi} were calculated which is depend on the work functions Φ_m and Φ_s .

The rhodium Rh is the best metal enable to contacts with germanium, silicon and gallium arsenide to increases the carrier concentration of the semiconductors was found. And also the good other metals like nickel, gold and platinum were found. But rhodium is the better.

ملخص البحث

في هذا البحث دُرس تأثير دوال الشغل ذات قيمة عالية لبعض المعادن على أشباه الموصلات باستخدام تقنية تلامس معدن مع شبه موصل لتحسين كفاءة شبه الموصل. بصورة عامة حُسب إرتفاع حاجز شوتكي Φ_B والجهد الداخلي V_{bi} اعتماداً على دوال الشغل Φ_m و Φ_s .
وُجد أن الروديوم أفضل معدن يمكن تلامسه مع الجرمانيوم، السليكون والغاليوم زرنيخ لزيادة تركيز حاملات شحنة لأشباه الموصلات. وإيضاً وُجد معادن أخرى جيدة مثل النيكل، الذهب و البلاتين. لكن الروديوم هي الأفضل.

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LIST OF ABBREVIATIONS

Abbreviation	Meaning
MSC	Metal-semiconductor contacts.
SD	Semiconductor devices.
MOSFET	Metal-oxide-semiconductor field transistor.
MESFET	Metal-semiconductor field transistor.
MODFET	Modulation-doped field effect transistor.
IC	Integrated circuit.
n	Number of electrons per unit volume.
p	Number of holes per unit volume.
n_i	Concentration of electron and hole in an intrinsic semiconductor.
E_g	Energy band gap between the conduction and valence band.
N_C	Effective densities of states in conduction band.
N_V	Effective densities of states in valence band.
K_B	Boltzmann's constant.
T	Temperature.
m_n	Effective masses of the electrons.
m_p	Effective masses of the holes.
h	Planck's constant.
E_f	Fermi level position.
E_C	Conduction band edge energy.
E_V	Valence band edge energy.
N_D	Concentration donors.
N_A	Concentration acceptors.
E_D	Donor energy.
E_A	Acceptor energy.
N_D^+	Ionized concentration for donors.
N_A^-	Ionized concentration for acceptor.
g_D	Ground-state degeneracy of the donor impurity level.
g_A	Ground-state degeneracy of the acceptor impurity level.
R	Resistance.
C	Capacitance.
L	Inductance.

l	Length of the conductor.
ρ	Resistivity.
A	Cross-section area.
σ	Conductivity.
d	Thickness of insulating material.
J	Current density.
q	Moving carrier charge.
μ_n	Electron mobility.
μ_p	Hole mobility.
\bar{n}	Refractive index.
K_e	Extinction coefficient.
α	Absorption coefficient.
ξ	Thermoelectric.
K_L	Component of photon lattice conduction.
K_M	Mixed free carrier conduction.
Φ_m	Work function of metal.
Φ_s	Work function of semiconductor.
Φ_B	Ideal barrier height.
Φ_n	Distance between E_C and E_f of semiconductor n-type after contact.
χ_s	Electron affinity.
V_{bi}	Built in potential.
V_R	Magnitude of the reverse-bias voltage.
V_a	Magnitude of the forward-bias voltage.
W	Space charge region width.
A^*	Effective Richardson constant for thermionic emission.
R_C	Specific constant resistance.