Study of electronic transport properties of transition metal tellurides: Cu_xPdTe_2 (x = 0, 0.04), $ZrTe_3$ and $ZrTe_5$

A Thesis

submitted by

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Dedicated to

my family members

Late Nihal Singh Hooda (grandfather)

Jaswant Singh Hooda (father)

Mayapati Punia (mother)

Monika Hooda (sister)

Dinesh Hooda (brother)

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Declaration by the Scholar

I hereby declare that the entire work embodied in this thesis is the result of investigations carried out by me in the **School of Basic Sciences**, Indian Institute of Technology Mandi, India, under the supervision of **Dr. C. S. Yadav**, and that it has not been submitted elsewhere for any degree or diploma. In keeping with the general practice, due acknowledgements have been made wherever the work described is based on finding of other investigators.

Place: Signature

Date: Name: **Mandeep Kumar Hooda**

Declaration by the Research Advisor

I hereby certify that the entire work in this thesis has been carried out by **Mandeep Kumar Hooda** under my supervision in ***School of Basic Sciences***, Indian Institute of Technology Mandi, and that no part of it has been submitted elsewhere for any Degree or Diploma.

Signature:

Name of the Guide: Dr. C. S. Yadav

Date:

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Glossary of symbols and acronyms used in this thesis

Symbols

k_F	Fermi wavevector
q	phonon wave vector
Δ	energy gap
g	dimensionless coupling constant
v_F	Fermi velocity
ρ_0	charge density in absence of CDW
ϕ	phase
ρ_1	amplitude and electronic energy gap of CDW
$\chi(q)$	Lindhard susceptibility or response function
T_C	superconducting transition temperature or critical temperature
H_c	critical magnetic field
$H_C(0)$	critical field at 0 K
$N(E_F)$	electronic density of states at Fermi level
$<\omega>$	average phonon frequency
θ_D	Debye temperature
V	electron-electron interaction parameter
μ^*	Coulomb repulsion parameter
$\lambda_{el\text{-}ph}$	electron-phonon coupling constant
$F(\omega)$	phonon density of states
$\alpha^2(\omega)$	average electron-phonon interaction
M	ionic mass
$<I^2>$	electron-phonon interactions over Fermi surface
γ	electronic specific heat coefficient
$N_{bs}(E_F)$	bare density of states
κ_{GL}	Ginzburg-Landau parameter
λ_L	London penetration depth
ξ	coherence length
zT	figure of merit