

1. Record Nr.	UNINA9910426042903321
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Titolo	Study of new ternary rare-earth intermetallic germanides with polar covalent bonding : beyond the Zintl picture // Riccardo Freccero
Pubbl/distr/stampa	Cham, Switzerland : , : Springer, , [2020] Â©2020
ISBN	3-030-58992-7
Edizione	[1st ed. 2020.]
Descrizione fisica	1 online resource (XXI, 221 p. 55 illus., 32 illus. in color.)
Collana	Springer Theses
Disciplina	620.11
Soggetti	Materials science
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Introduction -- Experimental Methods -- Theoretical Methods -- The R ₂ MGe ₆ (R = rare earth metal; M = another metal) Compounds: An Experimental and Theoretical Study on Their Synthesis, Crystal Structure and Chemical Bonding -- On the Existence, Crystal Structure and Physical Properties of R ₂ Pd ₃ Ge ₅ (R = rare earth metal) Intermetallic Germanides -- Lu ₅ Pd ₄ Ge ₈ , Lu ₃ Pd ₄ Ge ₄ and Yb ₂ PdGe ₃ : Three More Germanides among Polar Intermetallics.
Sommario/riassunto	The thesis focuses on the syntheses, structural characterizations and chemical bonding analyses for several ternary R–M–Ge (R = rare earth metal; M = another metal) intermetallics. The challenges in understanding the main interactions governing the chemistry of these compounds, which lead to our inability to predict their formation, structure and properties, are what provided the motivation for this study. In particular, the R ₂ MGe ₆ (M = Li, Mg, Al, Cu, Zn, Pd, Ag), R ₄ MGe _{10-x} (M = Li, Mg), R ₂ Pd ₃ Ge ₅ , Lu ₅ Pd ₄ Ge ₈ , Lu ₃ Pd ₄ Ge ₄ and Yb ₂ PdGe ₃ phases were synthesized and structurally characterized. Much effort was put into the stabilization of metastable phases, employing the innovative metal flux method, and into the accurate structure solution of twinned crystals. Cutting-edge position-space chemical bonding techniques were combined with new methodologies conceived to correctly describe the Ge–M, Ge–La and also La–M polar-covalent interactions for the La ₂ MGe ₆ (M = Li, Mg, Al, Cu, Zn, Pd, Ag) series. The present results constitute a step forward in our

comprehension of ternary germanide chemistry as well as providing a good playground for further investigations.
