PARALLEL CONFERENCES
ON ADVANCED MATERIALS

THE 4TH INTERNATIONAL WORKSHOP
ON FUNCTIONAL AND NANOSTRUCTURED MATERIALS

1–6 SEPTEMBER 2007
GDANSK AND HEL PENINSULA, POLAND

THE 8TH CONFERENCE ON INTERMOLECULAR
AND MAGNETIC INTERACTIONS IN MATTER

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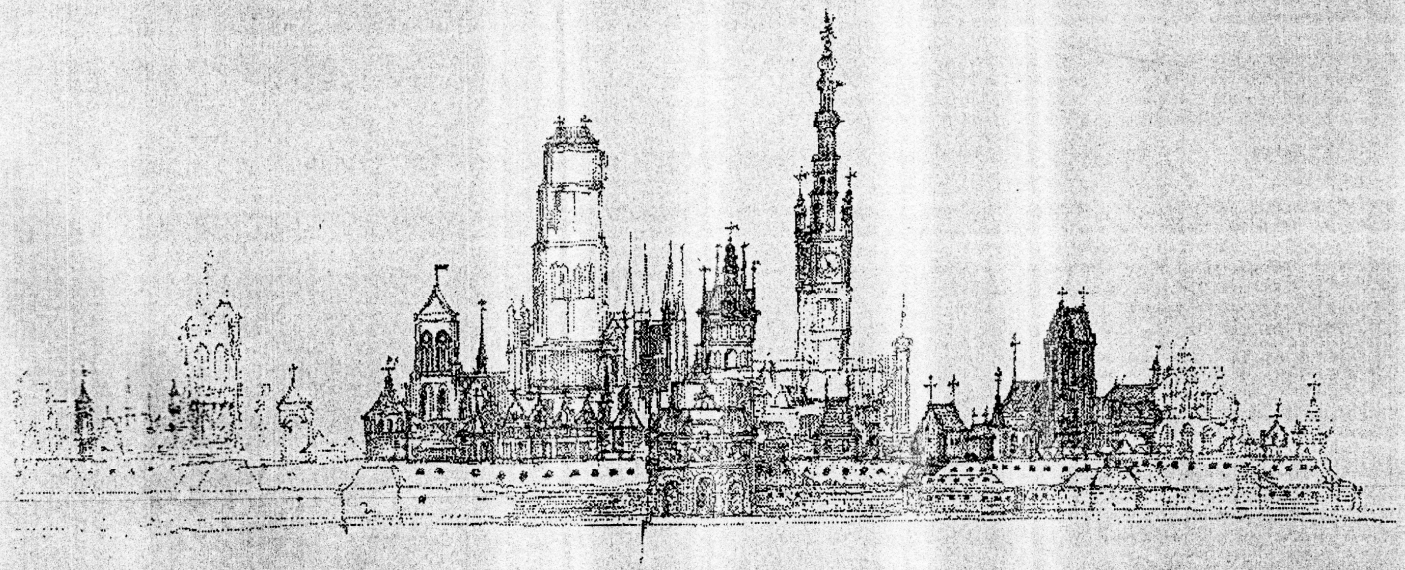

ABSTRACT BOOK

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Stability and Phase Changes in Thin Layers of Rare-earth Metals/Iron and Other Binary Compounds

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Thin films of binary compounds such as rare-earth metals-iron ($GdFe_2$, Gd_2Fe_{17}) were obtained by thermal vacuum evaporation of a polycrystal charge. In order to enable structural examination, a 500–600 Å thick films on were precipitated NaCl and KCl chips. The films' thickness was determined with an optical interferometer. The temperature of substrates carriers varied from 300 to 500 K. Structural research of the films was carried out with an electron microscope. The thermal resistance and kinetics of crystallization of amorphous condensates were explored through straight heating in the microscope's column at the rate of 5–30 K/min.

Temperature stability in the temperature dependence of substrates was investigated. Phase transformations were observed during crystallization of amorphous films. At room temperature of substrates (T_s) amorphous films are formed, amorphous-crystalline at T_s = 300–500 K, and polycrystalline at T_s > 500 K. Formation of two phases, Gd_6Fe_{23} and a–Fe, was observed upon crystallization of Gd_2Fe_{17} amorphous films. In the films obtained at substrate temperatures > 500 K, 3 phase sets were present: a hexagonal Gd_2Fe_{17} phase of the Th_2Ni_{17} structural type, a rhombohedral Gd_2Fe_{17} phase of the Th_2Zn_{17} structural type, and a hexagonal $GdFe_5$ phase of the $CaCu_5$ structural type. Films of the $GdFe_2$ compound were shaped in the reference for massive state $GdFe_2$ to cubic structure with face-centered lattice.