MS26 P01

Magnetite and Native Gold Nanoparticles From a Submarine –Hydrothermal Source Associated to the Peña Colorada Iron-Ores, Mexico. Alva-Valdivia, L. M.[a, c], Rivas-Sánchez, M. L.[a], Arenas-Alatorre, J.[b], Perrin, M.[c] [a]*Laboratorio de Paleomagnetismo, Instituto de Geofísica, Universidad Nacional Autónoma de México, 04510 México, D. F.* [b]*Instituto de Física, Universidad Nacional Autónoma de México,* [c]*Laboratoire Tectonophysique, UMR CNRS- Université Montpellier II.* E-mail: luis.alva@gm.univ-montp2.fr

Keywords: magnetite, gold, nanoparticles

Physical-chemical and mineralogical characterization studies permitted identification and analyses of magnetite and gold nanoparticles. This revelation provided enough information to infer the geological environment favorable for production of nanoparticles associated to a redox-aqueous ecosystem where the bacteria action acquires great importance. We used optical microscopy, Mössbauer spectroscopy, differential gravimetric thermoanalysis and high resolution transmission electron microscopy for the study of magnetite and gold nanoparticles. We infer the origin of magnetite and native gold nanoparticles formed in a submarine-hydrothermal environment of shallow to depth water.

MS26 P02

In – situ hot – stage transmission electron microscopy of $Pb(Zr_{1-x}Ti_x)O_3$: Ljubomira Ana Schmitt[a], Ralf Theissmann[b], Jens Kling[a], Hans Kungl[c], Michael Hoffmann[c], Hartmut Fuess[a], [a]*Institute of Materials Science, Darmstadt University of Technology, Darmstadt, Germany.* [b]*Institute of Nanotechnology, Research Centre Karlsruhe, Karlsruhe, Germany.* [c]*Institute of Ceramics in Mechanical Engineering, Universiy of Karlsruhe, Karlsruhe, Germany.* E-mail: ljuba@st.tu-darmstadt.de

Keywords: Transmission electron microscopy, ferroic domain structures, ferroelectrics.

The influence of maximum temperature, heating- and cooling rate on the domain configuration of $Pb(Zr_{1-x}Ti_x)O_3$ with x = 0.40, 0.45, 0.46, 0.47, 0.48 and 0.55 was analysed by transmission electron microscopy (TEM). Investigations were carried out to establish a basis for further hot-stage experiments including the observation of changes in domain morphology as a function of temperature. The investigations revealed a temperature dependent appearance and disappearance of nano- and microdomains. The appearance of domains in the nano scale range during cooling, denoted as domain miniaturisation, and the time dependent recovering of the former domain structure, revealed that under specific experimental conditions the domain configuration is reversible.

Samples with compositions around the morphotropic phase boundary showed formation of nanodomains within the microdomains [1]. The appearance of nanodomains in $Pb(Zr_{0.52}Ti_{0.48})O_3$ and $Pb(Zr_{0.53}Ti_{0.47})O_3$ was already described by Goo et al. [2] and Lucuta and Teodorescu [3]. Evidence of further twinning, however, within the nanodomains for composition $Pb(Zr_{0.54}Ti_{0.46})O_3$, designated as substructural twinning, is reported for the first time. The observations are consistent with the theory of Sapriel [4], Fousek and Janovec [5].

This work was funded by the Deutsche Forschungsgemeinschaft, Sonderforschungsbereich 595 “Electrical Fatigue in Functional Materials”.

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MS26 P03

Using of the electron microscopy in the study of alloys
L. Adnane, R. Kesri and S-E. Amara *Laboratoire de Métallurgie Structurale, Faculté de Chimie, USTHB BP 32 El Alia Algiers, Algeria.* E-mail : l_adnane@yahoo.fr

Keywords : electron microscopy; long range order; short range order; phases; alloys

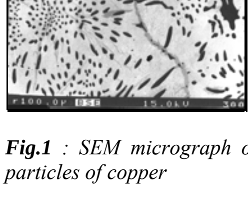
Commercial alloys like high speed steels and white cast irons have complex microstructures due to the variety of alloying elements that enter usually in their constitution. These alloys include c
arbides forming elements such Cr, Mo, W, V… which improve high hardness, and (or) other additions like Si, Al, Cu, Ni… which reinforce the matrix.

We present here a part of our study carried on ternary alloys FeMC (M:V,Cu) and quaternary alloys FeVXC (X:Cu,Al).

In the first stage of our study we have employed the diffraction of Xray to determinate the nature of the phases formed in our alloys. It’s turned out that this technique is limited for identify all the present phases cause of the strong matrix effect.

The microstructures are examined by scanning electron microscopy (fig. 1) and analysed by and microprobe. If these two methods gave good results for morphologies and for chemical analyses of phases rising from liquid reactions, it is not the same for those appearing at solid state.

To get round this insufficiency we employed transmission electron microscopy, which allow us to identify the precipitates and to highlight the presence of ordered structures at long and short distance in carbides. The following phases are revealed: primary and eutectic VC_{1-x} carbides, eutectic and proeutectoid cementite, ferrite and pearlite. Copious precipitation of Cu appears in (both in the ternary and quaternary) cementite shells, in the proeutectoid cementite and in the matrix (fig. 2). This precipitation may occur by interphase boundary diffusion during cooling. The VC_{1-x} carbides are sub-stoichiometric and exhibit long range order. The two ordered V_8C_7 (cubic) and V_6C_5 (hexagonal) structures have been identified (fig. 3).



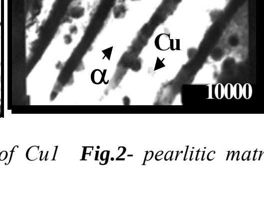


Fig.1 *: SEM micrograph of Cu1* ***Fig.2-*** *pearlitic matrix with particles of copper*