Orientation modulated EPR-introscopy of paramagnetic spin trap's with macroscopic magnetic anisotropy

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A new method of electron paramagnetic resonance (EPR) introscopy of spatial distribution of paramagnetic centers (PC) with a macroscopic magnetic anisotropy of any parameters of spin Hamiltonian are discussed. This method is original and based on common use of stationary W. Hinshaw technique and the orientation modulated EPR (OM EPR) [1] effect.

The conventional EPR introscopic methods [2,3] solve the problem of determination the distribution of PC incide specimens with a spatial resolution and sensitivity adequate for practical purposes. However, they record an integrated picture of this distribution, so that one cannot determine whether the PC belong to the crystalline state or are in disordered finely disperce state. Yet, such information is quite important because it is needed to detect crystallites in disordered or diamagnetic inclusions and determine if they are localized in the paramagnetic crystals, to study the dynamics of crystals growth, and in other situations. Here we describe a technique for recording EPR images of the spatial distribution of PC which have a macroscopic anisotropy only in one of the parameters of the spin Hamiltonian (the g-factor, the fine or superfine interaction energies, highest moments of spectral line, relaxation time, etc.), so that the anisotropy is consequently characteristic only of the crystalline phase of the specimen. This method [4-6] combines the familiar continuous-wave case W. S. Hinshaw technique, which is referres to as sensitive plane, line or point technique and OM EPR thechnique [1,7]. Standart subsequent synchronic detection of OM EPR signals discover anisotropic part of spectrum EPR, related to PC in crystallites. Isotropic part of spectrum is competelly inhibited. During relocation of plane (dot) of sensitivity along azis EPR-cnapshot of dispersion of PC with magnetic anisotropy along this axis is obtained. This method is safe experimentally examination [4-6].

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