In the case of flat semi-products made of aluminium and its alloys, one of the most important parameters affecting the anisotropic material properties of sheets is its crystallographic texture. This 'parameter' describes the suitability of sheets for plastic shaping. However, despite much experimental research performed to explain the mechanisms controlling the texture transformation during technological annealing processes, this mechanism still remains unclear. The present research program is a renewed attempt at explaining the microstructure and texture transformation mechanisms.

The aim of this project is to recognize and describe the mechanisms of the transformations taking place in the early stages of recrystallization in fcc metals of high stacking fault energy, as well as the effect of these transformations on the recrystallization texture formation.

Despite the fact that the issues investigated in the project are inspired by the actual problems resulting from industrial practice, they are strictly basic in character. **In the first part**, based on experiments with single and bi-crystalline samples, the performed research will aim at *obtaining fundamental information on the (micro)structural and texture transformations.* They will be based on high-resolution transmission and scanning electron microscopy. These changes will be analyzed both during the isothermal annealing of bulk samples and in the '*in-situ*' annealing experiments using transmission and scanning electron microscopes equipped with facilities for local orientation measurements. In the case of samples characterized by ultra-fine grained structures of the as-deformed state the 3D/SEM/EBSD technique will be used for detailed characterization of space distribution/situation of grain boundaries and the crystallographic relation between neighboring grains. This opens the possibility for identification the type of the grain boundary across the recrystallization front. **In the second part**, the recrystallization phenomena will be analyzed in polycrystalline, ultra- coarse and extremely fine-grained aluminium samples. They will especially aim at describing the influence of grain boundaries and their triple junctions on the dynamic and crystallographic determination of recrystallization.

In the proposed series of research, the key issue is the relation between the observed state of the structure and the anisotropy of different properties. This is a classic issue from the area of materials engineering concerning research which is basic and cognitive in character. Its solution, or even solution approximation, should significantly improve the knowledge of the morphological and texture transformations taking place during annealing.

From the practical point of view, the performed investigations will constitute the basis for further research aiming at elaborating the technological bases of producing the materials of anassumed anisotropic properties (since the subject is a crucial part of important technological processes for shaping flat bars, sheets or tapes, by stamping or rolling). In particular, during deep drawing of metals, the associated problem of anisotropic plastic flow is of key importance for both the quality of the fabricated final product and the 'economics' of the process itself.