

**Stage Master à MINES SAINT-ETIENNE (EMSE)
Centre SMS, Département PMM**

Application of high energy synchrotron X-ray diffraction to the study of texture and dislocation density evolution during annealing of deformed metals

Texture and microstructure are two important parameters that influence the physical properties of metallic alloys. Frequently, the properties of the alloys developed for engineering applications are formulated in terms of texture and grain size, which are obtained through recrystallization. The process is however very complex and there are no theories capable to predict the recrystallization textures, empirical knowledge playing the major role in practice. Recrystallization is usually preceded by recovery which, through dislocation annihilation, reduces the stored energy available for recrystallization.

The subject of this master internship is the understanding of recovery and recrystallization in novel High Entropy Alloys (HEA) developed at EMSE. The main question we address is how recovery influences the recrystallization process.

X-ray diffraction measurements were already performed at the Advanced Photon Source synchrotron in Chicago using a specific setup allowing for simultaneous determination of the texture and dislocation density. The successful candidate has to do the evaluation of these quantities using an already developed MATLAB program. Therefore, knowledge of MATLAB or a similar programming language (such as Python) is required.

The successful accomplishment of the proposed work will result in a scientific publication.

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