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SECONDARY DEFECTS IN QUENCHED ALUMINIUM STUDIED BY MÖSSBAUER SPECTROSCOPY (*)

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Abstract. — We measured the Debye-Waller factor, the isomer shift and the second-order Doppler effect in a quenched aluminium based alloy containing 200 ppm of $^{57}$Fe, after an annealing treatment up to temperatures ranging from 78 to 623 K. A discontinuity in the smooth variations of the Mössbauer parameters appeared for samples annealed at temperatures around 260 K, which depends on the quenching rate and the thermal history of the specimen. This discontinuity was interpreted both in terms of vacancies trapped at $^{57}$Fe impurities and the subsequent agglomeration process, and of annealing of the dislocation loops up to the initial stage of the precipitation of the iron. Supplementary investigations of the overall variations of the Mössbauer parameters led to information on the 3d $\rightarrow$ s electron transfer process related to the isomer shift temperature dependence.

(*) This paper is part of H. Georges-Gibert’s doctoral thesis.