## Intermetallic phase particles in 6082 aluminium alloy

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Fig. 3. The microstructure of 6082 alloy in the as-cast condition: a-b) ternary eutectic, c-d) the quaternary eutectic

**Purpose:** In the technical 6082 Aluminium alloys besides the intentional additions Mg i Si, transition metals and impurities (Fe and Mn) are always present. Even not large amount of these impurities causes the formation a new phase components. The exact composition of the alloy and casting condition will directly influence the selection and volume fraction of intermetallic phases. During casting of 6082 alloys, a wide variety of Fe-containing intermetallics phases AI-Fe, AI-Fe-Si and AI-Fe-Mn-Si are formed among the aluminium dendrites. The aim of this work was to examine the composition and morphology of complex microstructure of the intermetallics in 6082 aluminium alloy.

**Design/methodology/approach:** Light microscopy (LM), electron microscopy techniques (SEM and TEM) in combination with X-ray analysis (SEM/EDS), and X-ray diffraction (XRD) were used.

**Findings:** The examinations of the as-cast alloy after slow solidification at a cooling rate 2°C/min reveal that the Si,Si, Al9Mn3(FeMn)3FeSi, α-Al15microstructure consisted a wide range of intermetallics phases, namely: β-Al5 Si.2Si, Mg3Fe12α-Al.

**Research limitations/implications:** To facilitate confirmation of the achieved results it is recommended to execute supplementary analysis of the aluminium alloys, 6082 series in particular Practical implications: Since the, what involves changes of alloy properties, From a practical position it is important to understand formation conditions of the intermetallics in order to control final components of the alloy microstructure. The importance of this is due to the fact that morphology, crystallography and chemical composition of the intermetallics strongly affect the properties of the alloy.

**Originality/value:** This work has provided essential data about almost all possible intermetallic phases precipitating in 6000 series aluminium alloys

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Tags: <u>Aluminium Alloy 6068</u>, <u>Metallic alloys; Microstructure; Electron microscopy;</u> Intermetallic phases