Corrosion behavior of Al-Ce alloys in 3.5%NaCl solution

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The corrosion behavior of Al-xCe alloys was researched by microstructure characterization analysis, electrochemical and immersion tests in 3.5% NaCl solution. The result shows that the volume fraction of Al₄Ce phases increases notably with the increasing content Ce element, and Al₄Ce phase is the main part of Al-50wt%Ce alloy matrix. The corrosion mechanism is attributed to the potential difference between Al₄Ce and α -Al phases causing the galvanic corrosion. Al-15wt%Ce, Al-30wt%Ce and Al-50wt%Ce alloys exhibit different corroded characteristics. For Al-15wt%Ce and Al-30wt%Ce alloys, Al₄Ce phase is dissolved due to the anode effect. For Al-50wt%Ce alloy, α -Al phase are peeling off without enough support during the corrosion process. The corrosion rate of Al-xCe alloys increases in following order: Al-15wt%Ce > Al-50wt%Ce > Al-30wt%Ce. Thus, the corrosion behavior of Al-xCe alloys is related to the volume fraction of Al₄Ce phases.

Keywords: Al-Ce alloy; Microstructure; Corrosion behavior; Alloy target material

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