

одинаковый для алюминиевых сплавов полученных методом прокатки и методом РКУП.

Предложена качественная модель влияния концентрации магния в твердом растворе Al-Mg, параметров первичных алюмо-магниевых частиц, образующихся при кристаллизации сплавов, и процессов рекристаллизации на электрохимическое поведение сплавов Al-Mg.

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THE ELECTROCHEMICAL BEHAVIOUR OF ENVIRONMENT-FRIENDLY INHIBITORS IN CORROSION CONTROL OF CARBON STEEL IN NEUTRAL SOLUTION

Recently, the development of green corrosion inhibitors and green inhibition strategies are highly demanded because of the increasing demand of green chemistry in the area of science and technology. In last few decades, use of plant extracts as metallic corrosion inhibitors has attracted significantly attention. Plant materials are ideal green candidatures to replace traditional toxic corrosion inhibitors. Reduced environmental risk, lower cost, wide spread availability and high corrosion inhibition effectiveness make the plant extracts as suitable candidates to replace the expensive and toxic traditional synthetic corrosion inhibitors. The abundant chemical constituents, such as flavonoids, polyphenols, and polysaccharide, endow plant extract with the potential of inhibiting the corrosion process of mild steel. So, it is an interesting and useful task to find new sources for highlighting anticorrosive active compounds and to obtain organic compounds for their further use as inhibitor of steel corrosion in various aggressive media [1].

In the present work, ethanol apricot pomace extract (APE), which was extracted and tested to control the corrosion of mild steel in different

operating condition. The inhibiting action of ACE on corrosion of steel in 0.5 M NaCl solution was investigated via potentiodynamic polarization method. Weight loss measurements were used to measure the corrosion rate in the absence and presence of inhibitor. The linear polarization technique (LPR) was applied to study time variation of the corrosion rate. Polarization resistance values R_p for each probe were measured automatically every 15 min in a galvanostatic mode. R_p was determined as a quotient of the potential response to the applied current. The density of polarizing current was $i = 5 \mu\text{A}/\text{cm}^2$. Fourier transform infrared spectroscopy (FTIR) and scanning electron microscopy (SEM) were employed to characterize the extract and the surface morphology of steel, respectively. GC-MS analysis of the EtOH extract of apricot pomace indicates the presence of 40 phytochemical compounds. All of them are known compounds and are easily identified by mass spectrum and linear retention indices. The main components are aldehydes: hexanal (1.32%), (E)-2-hexanal (3.10%), (Z)-2-heptenal (3.65%), heptanal (2.18%), 2-phenylacetaldehyde (1.29%), β -cyclocitral (5.17%), (E,E)-2,4-decadienal (3.65%), also ketones: 2-hexanone (1.03%), 3-hexanone (0.54%). The class of alcohols is presented by (Z)-3-hexenol (0.76%), (E)-2-hexenol (1.87%), hexanol (5.67%). In a minor amount, the extract contains esters, such as (E)-2-hexenyl acetate (2.78%), (Z)-3-hexenyl butanoate (1.51%), hexyl hexanoate (2.12%). From this analysis it is found that corrosion inhibition is mainly due to the presence of organic compounds present in the apricot pomace. The results clearly show that corrosion rate was reduced in the presence of the extract in comparison to the blank without inhibitor.

The immersion time is an important parameter in assessing the stability of corrosion inhibitive properties of organic compounds. In this way, linear polarization technique useful technique for long time tests, because it does not significantly disturb the inhibitor-metal system and it is possible to follow it over time. The experiments were performed after different immersion times (1-96 h) at the highest concentration of APE (100 mg/L) in 0.5 M NaCl solution. The formation process of protective layer can be classified into two steps, namely fast adsorption (2-18 h) as the first step and then a slow chemical transformation the molecules that were adsorbed on the steel surface (20-48 h). With increase in immersion time, the film becomes denser and more stable. Corrosion protection efficiency increased with extract concentration but decreased slightly over prolonged exposure time. The increase in inhibitor efficiency may result from the fact that adsorption and surface coverage increases with the increase in concentration. As concentration increases, more inhibitor molecules are adsorbed on the metal surface resulting in larger surface coverage.

Potentiodynamic polarization curves indicate that the APE extract acts as a mixed - type inhibitor. Surface analysis techniques (SEM) also confirm the adsorption of the components of the extract on the mild steel surface. From weight loss and electrochemical studies, it has been found that the ACE acted as a good corrosion inhibitor for mild steel in 0.5 M NaCl solution.

REFERENCES

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ДИНАМИКА ЛОКАЛЬНОГО РАСТВОРЕНИЯ НЕРЖАВЕЮЩЕЙ СТАЛИ В ХЛОРИДНЫХ РАСТВОРАХ НА НАЧАЛЬНОЙ СТАДИИ ЗАРОЖДЕНИЯ ПИТТИНГОВ

Питтинговая коррозия - один из наиболее опасных и распространенных видов локального коррозионного разрушения пассивирующихся металлов и сплавов в средах, содержащих ионы-активаторы. Исследования питтинговой коррозии представляет особый интерес и значимость во многих научных и технологических применениях. По мере накопления информации был опубликован ряд обзоров и работ, посвященных различным аспектам питтинговой коррозии: влиянию отдельных факторов на процесс питтингообразования [1,2], развитию теории процесса зарождения питтинга на чистых металлах и нержавеющей сталях, кинетике; развития питтингов; питтинговой коррозии металла в условиях теплообмена; роли комплексообразования в развитии питтингов и др.

В общей проблеме питтингов можно выделить три основные задачи: зарождение питтингов, т.е. появление их зародышей; развитие этих зародышей в начальные питтинги, возникновении взаимодействия между ними, приводящего к гибели слабых из них; механизм роста выживших питтингов. Если две последние достаточно