

Effects of Ni Content in Zn-Ni Alloys on Phosphatability and Press Formability of Automotive Exposed Panels

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Synopsis :

In order to use Zn-Ni alloy electroplated steel sheets to be used on the exposed side of automotive bodies, effects of Ni content on press formability and zinc phosphatability were studied. Zn-

show good press formability and zinc phosphatability. Alloys containing Ni below 9% have a 2nd phase, which is less noble

alloys exhibit high frictional resistance in a press simulating test and are poor in press formability. In zinc phosphatability, the phosphate coating weight on these alloys changes with the flow rate of the zinc phosphate solution, which may cause a trouble with the coating uniformity. Therefore, it is important to control Ni content and the phase composition of the Zn-Ni alloy produced for the exposed side of automotive bodies.

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要旨

Zn-Ni めっき鋼板を自動車車体外面に使用するにあたり、Ni 含
有率による成形性、リン酸処理性に対する影響を調べた。



Table 1 Mechanical properties of the steel substrate

YS (MPa)	TS (MPa)	EI (%)	$\bar{\epsilon}$
177	316	45.8	1.7

Table 2 Electrolyte composition for Zn-Ni alloy electroplating

KCl	4.7 mol/l
NiCl ₂ +ZnCl ₂	2.5 mol/l

Table 4 Cylindrical shell draw test condition

Punch diameter	33 mm ϕ
Blank holding force	29.4 kN
Drawing speed	25 mm/min
Lubricant	Rust preventive oil

2.3 りん酸塩処理性評価方法

従来りん酸塩処理性の評価は、塗装との密着性や塗装後の耐食性を評価するが、本論文では、りん酸塩処理後のZn-Niめっきの性能向上を目的として、

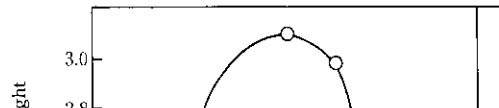
つき層を溶解するときの電極電位変化を白金を対極とし飽和甘汞電極で測定し、相同定を行った。

Flow rate (m/min)
0 15

3 実験結果

3.1 プレス成形性

Zn-Niめっき鋼板のプレス成形性におけるNi含有率の影響を調



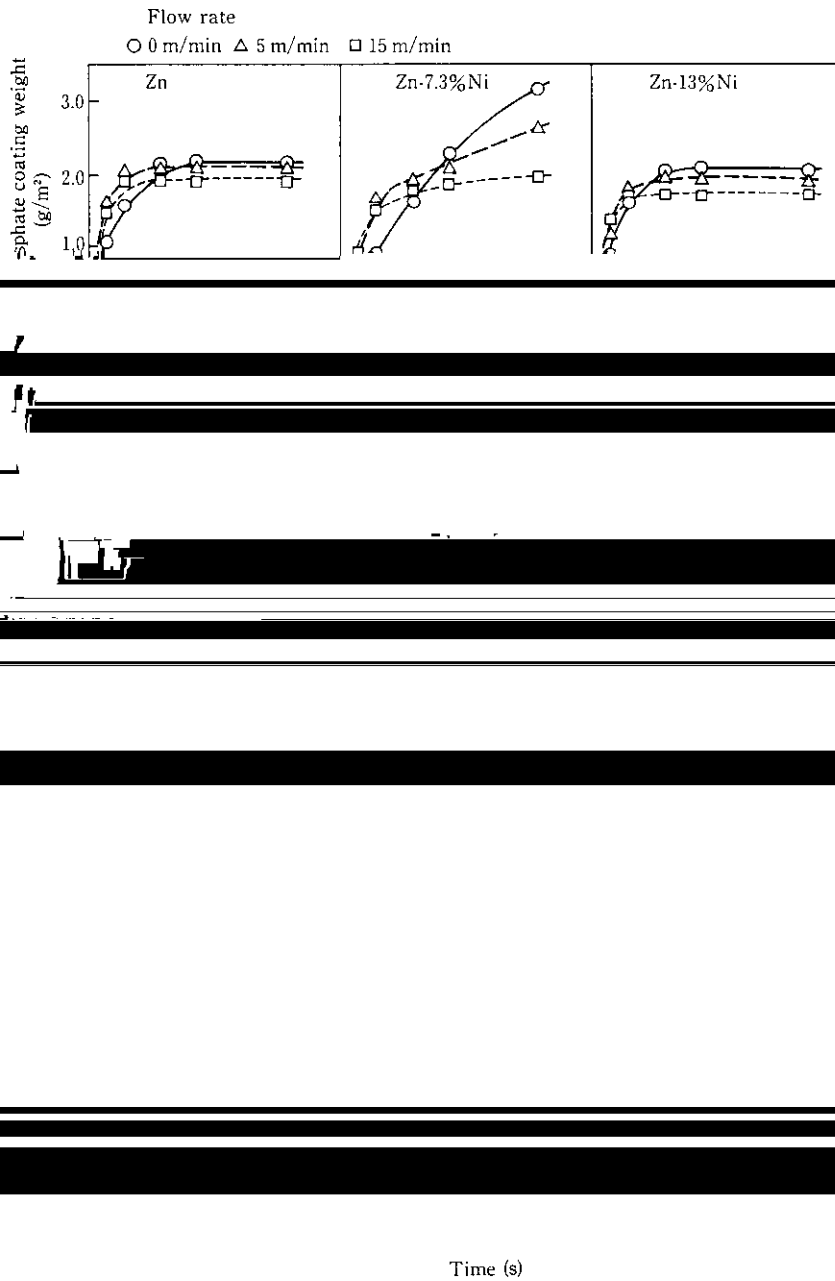
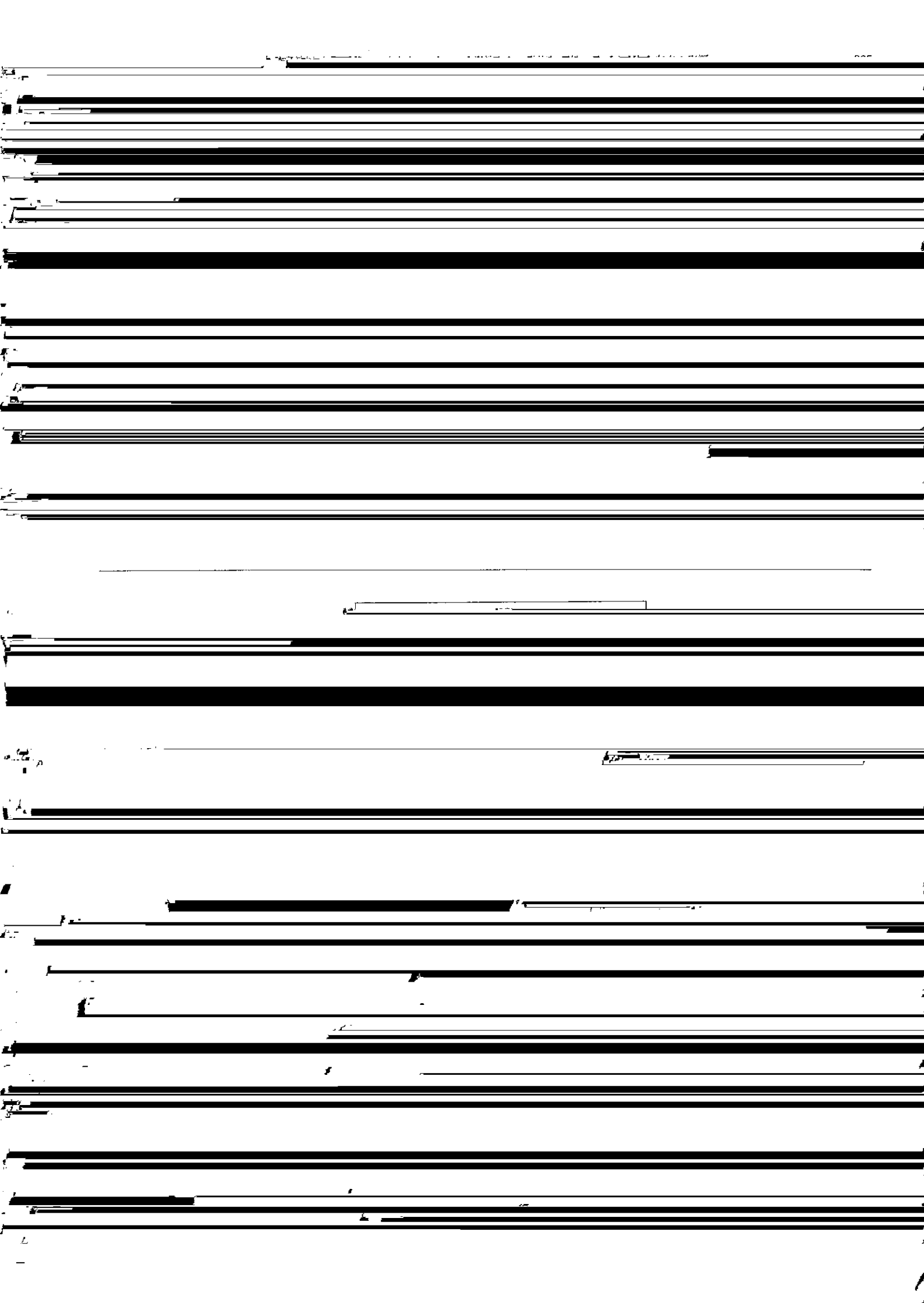


Fig. 5 Growth of phosphate coating on Zn-Ni alloys under various solution flow rate





め、低 Ni 材でむらが発生しやすいことがわかる。

塩処理に優れた電気 Zn-Ni 合金めっき鋼板は、めっき層中の Ni 含

よる Zn の溶解および (2) めっきと溶液界面での pH 上昇および

めっきを得るために、浴組成の影響を調査したところ、特に第 2 相