

Pengaruh parameter proses pelapisan nikel krom terhadap morfologi lapisan kekuatan tarik kekuatan tekuk dan kekerasan pada baja karbon rendah = Effect of parameters chrome nickel coating toward morphology layer tensile strength bending strength and hardness on low carbon steel

Abd Rasyad, author

Deskripsi Lengkap: <https://lib.ui.ac.id/detail?id=20403832&lokasi=lokal>

Abstrak

[Proses electroplating adalah proses pengendapan elektro lapisan logam pada elektroda yang bertujuan untuk membentuk permukaan logam dasar dengan sifat atau dimensi yang berbeda. Penelitian ini bertujuan untuk mengetahui pengaruh parameter waktu, suhu dan kuat arus pada pelapisan terhadap lapisan morfologi, kekuatan tarik, kekuatan tekuk dan kekerasan permukaan dengan menggunakan spesimen berupa plat baja karbon rendah berjumlah 41 buah dengan ukuran panjang 260 mm, lebar 30 mm dan tebal 2 mm sebagai logam dasarnya, sedangkan nikel dan krom sebagai pelapisnya. Variasi waktu pelapisan adalah 5 menit, 10 menit dan 15 menit., variasi suhu 50°C, 55°C dan 60°C dan variasi kuat arusnya 4 Amper, 5 Amper dan 6 Amper. Pelapisan pada plat dengan waktu 15 menit, temperatur 50°C dan kuat arus 6 Amper mempunyai nilai ketebalan yang paling tinggi yaitu 14 mikron bila dibandingkan dengan kondisi yang sama dengan waktu 5 menit yaitu 8 mikron dan untuk waktu 10 menit 9 mikron. Sedangkan untuk nilai kekuatannya pada waktu 10 menit, temperatur 50°C dan kuat arus 5 Amper mempunyai nilai yang paling tinggi yaitu 376 N/mm² bila dibandingkan dengan kondisi temperatur yang sama dengan waktu 5 menit dan 15 menit yaitu 317 N/mm² dan 309 N/mm². Kekuatan tekuk pada waktu 15 menit, temperatur 60°C dan kuat arus 6 Amper menunjukkan nilai yaitu 10.25 kg/mm² sampai 10.5 kg/mm² yang tidak mempunyai perbedaan kekuatan tekuk dibandingkan dengan bahan dasar aslinya yaitu 10.5 kg/mm². Sedangkan pelapisan pada waktu 5 menit, temperatur 60°C dan kuat arus 6 Amper mempunyai nilai kekerasan paling tinggi yaitu 100 VHN bila dibandingkan dengan kondisi temperatur yang sama, waktu 10 menit maupun 15 menit yaitu 97 VHN dan 99 VHN. Hasil penelitian ini menyimpulkan bahwa parameter waktu, suhu dan kuat arus pada pelapisan kurang berpengaruh signifikan terhadap kekuatan tarik, kekuatan tekuk dan kekerasan.

<hr>

Electroplating is a process of electro deposition of metal layers on the electrode which aims to form a metal surface with different properties or dimensions from the metal base. The purpose of this study is to know the effects using parameters of time, temperature and current on coating toward the morphology layer, tensile strength, bending strength and hardness using a steel plate specimen with the measure of 260 mm length, 30 mm width, and 2 mm thickness which amounts to 41 pieces and metal as the base while the nickel and chrome as coatings. The variables time of coating are 5 minutes, 10 minutes, and 15 minutes, variables of temperature are 50°C, 55°C, 60°C and variables of current are 4 amperes, 5 amperes and 6 amperes. Coating a specimen at time of 15 minutes, temperature of 50 °C and current of 6 amperes has the highest thickness value which is 14 microns wide if compared to the same condition with time of 5 minutes which is 8 microns wide, and with time of 10 minutes which is 9 microns wide. While for the value of tensile strength at time of 10 minutes, temperature of 50°C and current of 5 amperes has the highest value which is 376 N/mm² if compared to the condition with the same temperature, time of 5 minutes and 15 minutes

which are 317 N/mm² and 309 N/mm². The bending strength at time of 15 minutes, temperature of 60°C, and current of 6 amperes showed the value is 10.25 N/mm² until 10.5 N/mm² that does not have bending strength differences if compared with the original base material which is 10.5 N/mm². While coating at time of 5 minutes, temperature of 60°C and current of 6 amperes has the highest hardness value which is 100 VHN if compared to condition with the same temperature, time of 10 minutes and 15 minutes which are 97 VHN and 99 VHN. From the results of this study concluded that the parameters of time, temperature and current on coating give less significant effects toward tensile strength, bending strength and hardness.

Electroplating is a process of electro deposition of metal layers on the electrode which aims to form a metal surface with different properties or dimensions from the metal base. The purpose of this study is to know the effects using parameters of time, temperature and current on coating toward the morphology layer, tensile strength, bending strength and hardness using a steel plate specimen with the measure of 260 mm length, 30 mm width, and 2 mm thickness which amounts to 41 pieces and metal as the base while the nickel and chrome as coatings. The variables time of coating are 5 minutes, 10 minutes, and 15 minutes, variables of temperature are 50°C, 55°C, 60°C and variables of current are 4 amperes, 5 amperes and 6 amperes. Coating a specimen at time of 15 minutes, temperature of 50 °C and current of 6 amperes has the highest thickness value which is 14 microns wide if compared to the same condition with time of 5 minutes which is 8 microns wide, and with time of 10 minutes which is 9 microns wide. While for the value of tensile strength at time of 10 minutes, temperature of 50°C and current of 5 amperes has the highest value which is 376 N/mm² if compared to the condition with the same temperature, time of 5 minutes and 15 minutes which are 317 N/mm² and 309 N/mm². The bending strength at time of 15 minutes, temperature of 60°C, and current of 6 amperes showed the value is 10.25 N/mm² until 10.5 N/mm² that does not have bending strength differences if compared with the original base material which is 10.5 N/mm². While coating at time of 5 minutes, temperature of 60°C and current of 6 amperes has the highest hardness value which is 100 VHN if compared to condition with the same temperature, time of 10 minutes and 15 minutes which are 97 VHN and 99 VHN. From the results of this study concluded that the parameters of time, temperature and current on coating give less significant effects toward tensile strength, bending strength and hardness.

Electroplating is a process of electro deposition of metal layers on the electrode which aims to form a metal surface with different properties or dimensions from the metal base. The purpose of this study is to know the effects using parameters of time, temperature and current on coating toward the morphology layer, tensile strength, bending strength and hardness using a steel plate specimen with the measure of 260 mm length, 30 mm width, and 2 mm thickness which amounts to 41 pieces and metal as the base while the nickel and chrome as coatings. The variables time of coating are 5 minutes, 10 minutes, and 15 minutes, variables of temperature are 50°C, 55°C, 60°C and variables of current are 4 amperes, 5 amperes and 6 amperes. Coating a specimen at time of 15 minutes, temperature of 50 °C and current of 6 amperes has the highest thickness value which is 14 microns wide if compared to the same condition with time of 5 minutes which is 8 microns wide, and with time of 10 minutes which is 9 microns wide. While for the value of tensile strength at time of 10 minutes, temperature of 50°C and current of 5 amperes has the highest value which is 376 N/mm² if compared to the condition with the same temperature, time of 5 minutes and 15 minutes which are 317 N/mm² and 309 N/mm². The bending strength at time of 15 minutes, temperature of 60°C, and current of 6 amperes showed the value is 10.25 N/mm² until 10.5 N/mm² that does not have bending strength differences if compared with the original base material which is 10.5 N/mm². While coating at time of 5 minutes, temperature of 60°C and current of 6 amperes has the highest hardness value

which is 100 VHN if compared to condition with the same temperature, time of 10 minutes and 15 minutes which are 97 VHN and 99 VHN. From the results of this study concluded that the parameters of time, temperature and current on coating give less significant effects toward tensile strength, bending strength and hardness.]