

Yossapong Boonplook 2013: The Influence of Distance between Electrode of Surface Coating on Cold Work Tool Steel AISI D2 using Packed Boriding Process with Applied Direct current. Master of Engineering (Materials Engineering), Major Field: Materials Engineering, Department of Materials Engineering. Thesis Advisor: Mr.Patiphan juijerm, Dr.-Ing. 98 pages.

Recently, a cold work tool steel AISI D2 is used normally for metal forming process which surface damage is found frequently. Thus, surface treatments to improve a tool life are performed generally on tool steels before an operating process. A packed boriding process is one of the most well-known thermochemical surface treatments which possess a very high hardness layer at the surface. However, the boriding process has to operate at a high temperature with a prolonged soaking time to create a greater thickness taking into account the diffusion theory. An applied direct current field is a possible method to enhance diffusion rate of boron atom. But the complex model of work piece. Samples were arranged in different positions in a sealed pack boriding container When distance between electrode are more far that can be improve the boriding process. For this reason, in this research, effects of distance between electrode during boring process was investigated on the cold work tool steel AISI D2 by the applied current density in the range of 80 mA/cm^2 at a temperature of 850 900 and 950 °C with boriding time of 2 4 and 6 hr and distance between electrode 15 30 and 45 mm. Afterwards, microstructure and hardness values were investigated using optical microscope and micro-vicker harness tester, respectively. It was found that a double phase FeB and Fe₂B was detected on the boride layer. The near surface hardness value of about 1600 HV was measured the distance between electrode 15 mm a greatest thickness of boride layer. However distance between electrode 30 is obtained greater thickness than distance between electrode 45 mm.

Student's signature

Thesis Advisor's signature