

ABSTRAK

Penelitian ini bertujuan untuk mengetahui pengaruh variasi rasio karbon arang kelapa dan katalisator cangkang telur terhadap kekerasan permukaan baja AISI 1045 melalui proses *pack carburizing*. Metode yang digunakan adalah eksperimen dengan lima variasi komposisi media karburisasi, yaitu 100%:0%, 90%:10%, 80%:20%, 70%:30%, dan 60%:40% untuk karbon dan katalis, pada suhu 900°C selama 60 menit. Sampel diuji menggunakan metode kekerasan *Rockwell* dan pengamatan struktur mikro dilakukan dengan mikroskop optik. Hasil penelitian menunjukkan bahwa komposisi 80% arang kelapa dan 20% cangkang telur memberikan kekerasan permukaan tertinggi sebesar 90,60 HRB dan menghasilkan struktur mikro dengan fasa perlit yang lebih dominan serta sebaran yang merata, sedangkan penambahan katalis yang berlebihan (30-40%) cenderung menurunkan efektivitas difusi karbon ke permukaan baja.

Kata kunci: *Pack carburizing*, AISI 1045, arang kelapa, cangkang telur.

ABSTRACT

This study aims to determine the effect of varying the carbon ratio of coconut shell charcoal and eggshell catalyst on the surface hardness of AISI 1045 steel through the pack carburizing process. The method used was experimental, involving five variations of carburizing media compositions, namely 100%:0%, 90%:10%, 80%:20%, 70%:30%, and 60%:40% for carbon and catalyst, conducted at a temperature of 900°C for 60 minutes. The samples were tested using the Rockwell hardness method, and the microstructure was observed using an optical microscope. The results showed that the composition of 80% coconut shell charcoal and 20% eggshell catalyst produced the highest surface hardness value of 90.60 HRB and formed a microstructure dominated by uniformly distributed perlite phases. In contrast, higher catalyst additions (30-40%) tended to decrease the effectiveness of carbon diffusion into the steel surface.

Keywords: Pack carburizing, AISI 1045, coconut shell charcoal, eggshell catalyst.