

The scale layer structure in HT 3C sample is thicker than other samples, but due to the increasing of oxide thickness then the appearance of oxide scale optically dominates than the metal base. The correlation between temperature and holding time and scale thickness can be seen in figure below.

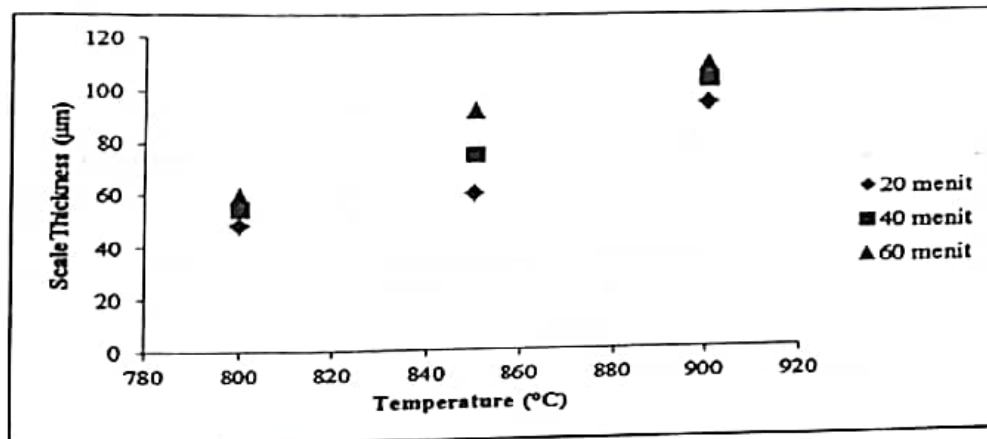


Fig. 4. Result of Scale Thickness

Figure 4 showed the the increase of temperature and holding time influenced the increase of scale thickness. This is due to the tendency of metals to react with oxygen driven by the decrease of free energy that follows the formation of oxide [David, 2005]. In line with the increase of temperature and holding time which influence the scale thickness, then the increase of temperature and holding time also influenced the lose scale. The mass loss occurred because the scale will result the loss of metal about one (1) to five (5) percent or more and the possibility of surface defects in rolling process [William, 1983].

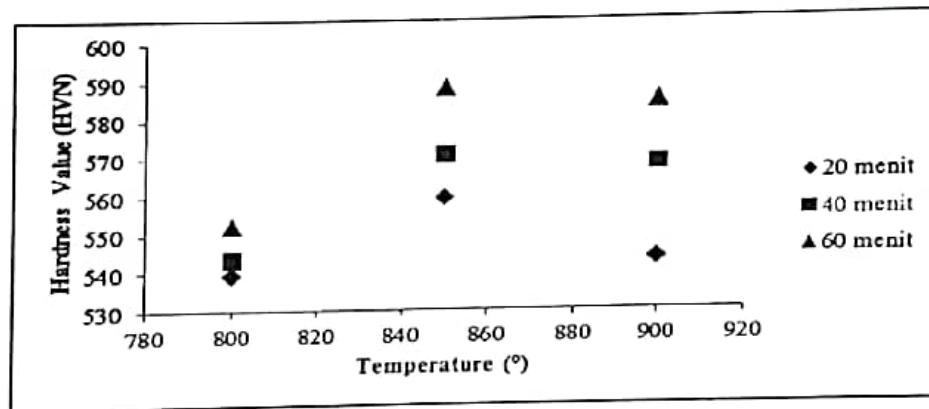


Fig. 5. The Correlation between Temperature and Hardness

Figure 5 showed the correlation between temperature and hardness. The graph showed the increase of hardness at 850°C of temperature and the decrease of hardness at 900°C of temperature. It is in line with the results of micro structure on the previous figure 4 that the larger the grain size, the lower the hardness. The smaller the grain size, the better the hardness value [Reed-Hill, 1994].