

INTISARI

Tujuan dari penelitian ini adalah untuk melakukan studi visualisasi tentang pengaruh konsentrasi *ethylene glycol* pada perilaku tetesan *droplet* berturut-turut selama menumbuk ke permukaan horizontal padat panas. *Droplet* yang diuji adalah air murni dan dua campuran *ethylene glycol* dan air, yang mengandung 10% dan 20% *ethylene glycol*. Sebagai permukaan padat, digunakan pelat silinder *stainless steel* yang dipoles (SUS 304), dengan kekasaran permukaan 0,06 μm . Temperatur permukaan bervariasi dari 110 °C hingga 240 °C. Fenomena terperinci tumbukan *droplet* direkam dengan menggunakan kamera video berkecepatan tinggi dengan kecepatan 2000 fps dan resolusi 1024x768. Selain itu, teknik pemrosesan gambar digunakan untuk mendapatkan parameter kuantitatif, seperti rasio penyebaran dan tinggi puncak selama tetesan menumbuk padatan panas. Dapat disimpulkan bahwa dengan penambahan konsentrasi *ethylene glycol* menyebabkan penurunan osilasi *droplet* selama fase penyebaran dan menunda pembentukan gelembung dan adanya *secondary droplet*. Selanjutnya, penelitian ini juga mengungkapkan bahwa keberadaan tetesan kedua berhasil meningkatkan area pembasahan.

Kata kunci: *Multiple droplets, Ethylene glycol, Spreading ratio, Apex height, Spray cooling*

ABSTRACT

The present work aimed to conduct the visualization study on the effect of the ethylene glycol concentration on the interfacial behavior of successive droplets during the impacting onto a horizontal hot solid surface. The tested liquid droplets were pure water and two ethylene glycol-water mixtures, which contain 10 % and 20 % of ethylene glycol. A polished cylindrical plate of stainless steel (SUS 304), with the surface roughness of 0.06 μm , was utilized as a solid surface. The surface temperatures varied from 110 °C to 240 °C. The detailed phenomena during the droplet impact were recorded by using a high-speed video camera with the frame speed of 2000 fps and the resolution of the 1024 x 768. In addition, an own developed image processing technique was also implemented to obtain the quantitative parameters, such as the spreading ratio and the apex height during the droplet impacting onto a hot solid. As a result, the interfacial dynamics of the successive droplets were clarified. The addition of the concentration of ethylene glycol leads to the decrease of droplet oscillation during the spreading phase and delays both the bubble formation and the presence of secondary droplets. In addition, the research also reveals that the presence of the second droplet successfully improves the wetting area of the droplet.

Keyword: Multiple droplets, Ethylene glycol, Spreading ratio, Apex height, Spray cooling