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Vortical Structure and Heat Transfer Enhancement in the Wake behind a Wing-Type Vortex Generator in Drag-reducing Surfactant Flow

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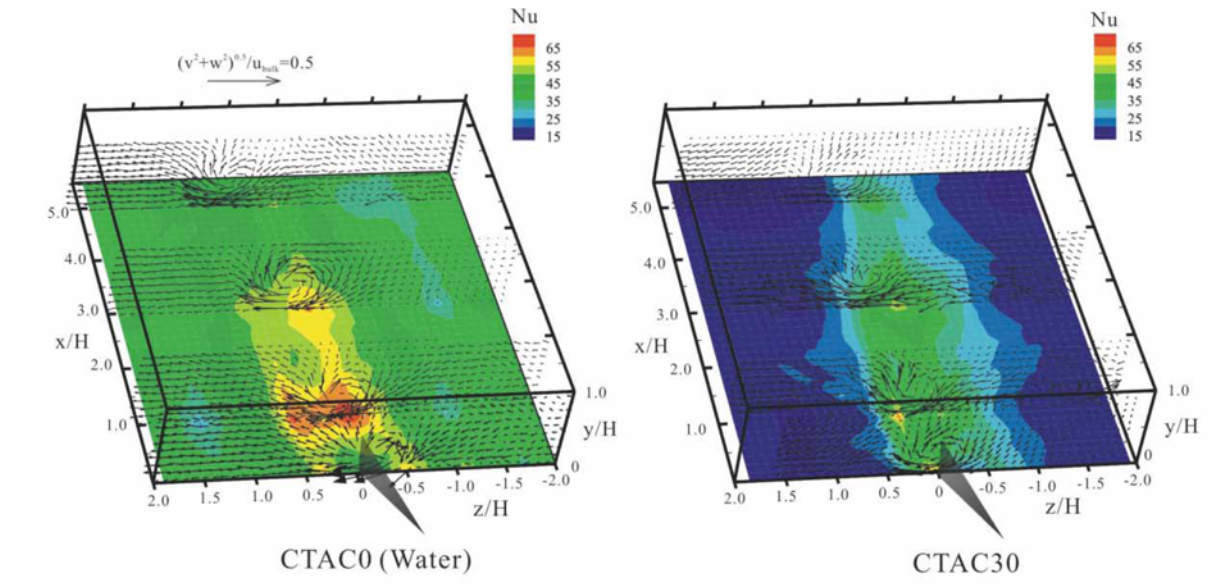
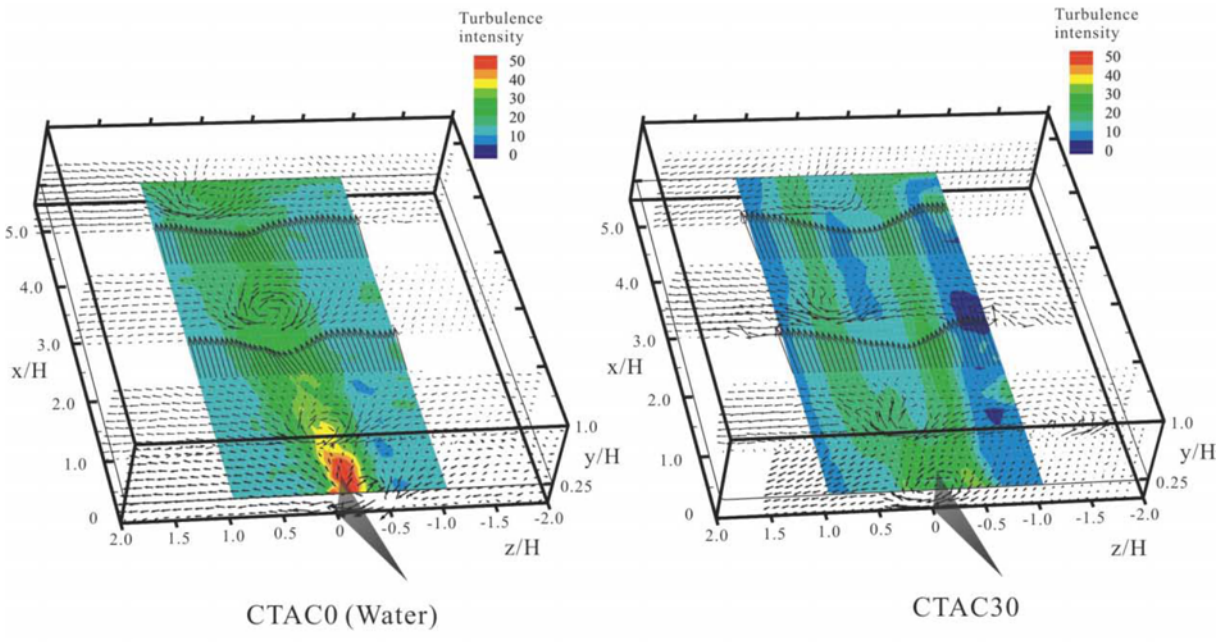


(a) Nusselt number distributions and (v,w)-velocity maps



(b) Turbulence intensity distributions and velocity maps of (v,w)-and (u,w)-components

These figures were obtained by two-dimensional PIV measurement and wall heat transfer measurement in the channel flows of water (CTAC0) and surfactant (30 ppm CTAC/NaSal, CTAC30) under $Re = 4{,}500$. The top figures show the wall heat transfer distributions and (v, w)-velocity fields in several cross-sections, while the bottom ones show the turbulence intensity distributions in the xz-plane (y/H=0.25) with (v, w)- and (u, w)-velocity fields. It is clearly seen that the remarkable heat transfer reduction of CTAC30 is recovered in the regions behind the wing-type vortex generator, where longitudinal vortical flows are generated with relatively high turbulent intensities.