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Abstract
Collision behaviors of equal-and unequal-sized drops were observed by colliding two piezo-electrically generated mono-dispersed drop streams. The bio-diesel oil contained 40 per cent sunflower oil mixed with 60 per cent diesel oil. The collision results of bio-diesel oil drops were compared to those of diesel oil drops.
The dimensionless parameters which controlled the collision evolution were the Weber number (We), the impact parameter (X), and the diameter ratio (△). In the range of , three collision outcomes, namely, bouncing, coalescence, and stretching separation, could be observed for diesel and bio-diesel drops of all diameter ratios; while the fourth outcome, i.e. reflex separation could only be observed for △=1 diesel, △=0.7 diesel, and △=1 bio-diesel drops.
The experimental results further showed the following comparisons for bio-diesel and diesel drops. First, the threshold Weber number for reflex separation was higher for bio-diesel drops than for diesel drops. Second, in the collision regime map, the coalescence area was larger for bio-diesel drops than for diesel drops. And third, the threshold impact parameter for the occurrence of stretching separation was higher for bio-diesel drops than for diesel drops.
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