Production of micron size spherical wax beads using a T-junction microfluidic device

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Waxes are employed in toner to improve its anti-offset characteristic at low or high temperature and fixability at a low temperature. On the other hand, the addition of waxes can lead to adverse effects also, such as blocking, intensification of anti-developing performance when exposed to high temperature within a copier, and reduced performance due to bleeding of the wax during storage for a long term. Thus, employment of wax in toner particles for printing has a room for improvement in view of energy-saving and high quality printing. Addition of monodisperse wax micro particles can enhance the toner performance by precise control of composition, which enables finer printing. This study aims the production of spherical micron sized wax toner beads in a microfluidic system. T-junction microfluidic device was fabricated using standard photolithography techniques for wax droplet formation above the melting temperature of wax. Wax melt droplets were then solidified to make solid wax beads. The size of the particles could be tuned by controlling the flow conditions and temperature of the microfluidic device and sub-micron sized wax particles could be obtained.