**Homogeneous, Continuous and Highly Selective mono-Bromination of 3-Methylanisole in a Microreactor System**

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**Highlights**

* Synthesize continuously 4-bromo-3-methylanisole in a microreactor system.
* Improve dramatically mono-brominated selectivity in a homogeneous reaction.
* Simplify greatly the purification process of crude 4-bromo-3-methylanisole.

**1. Introduction**

4-Bromo-3-methylanisole (BMA) is mainly used to synthesize ODB-2 which is the most important heat-sensitive dye in the manufacture of thermal paper. 1-2 In industry, BMA has been mass-produced by mono-bromination of MA with Br2 - aq. HBr (Scheme 1). The crude BMA has to be distilled to remove high boiling point bis/tris-brominated byproducts (PB) because of the low mono-brominated selectivity in a heterogeneous reaction system. Therefore, the microreactor technology is expected to intensify the mixing and heat exchange of bromination reaction to reduce PB content in a homogenous reaction system and simplify the purification process of crude BMA.



**Scheme 1.** Heterogeneous Brominated Reaction

**2. Methods**

The homogeneous bromination of MA in CHCl3 was performed in the microreactor system (Figure 1) whose core components are the micro-sieve dispersion reactor (Figure 2). Considering the corrosiveness of Br2 and HBr, the tubes, M1 and M2 are made of PTFE. 3-4

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| **Figure 1.** Structure of Micro-sieve Dispersion Reactor | **Figure 2.** Microreactor System |

**3. Results and discussion**

The mono-brominated selectivity (Figure 3) and BP content (Figure 4) were compared in the heterogeneous and homogeneous reaction system.

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| **Figure 3.** The Comparison of BMA Yield | **Figure 4.** The Comparison of PB Content |

**4. Conclusions**

BMA was synthesized continuously in a microreactor system under homogeneous conditions. The PB content can be controlled below 0.5% at a mild temperature (20-25 oC) in a minute residence time. Finally, the distillation purification of crude BMA is unnecessary as result of higher mono-brominated selectivity.

**References**

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