

## One-Pot Self-Condensation of Phenylboronic Acid with Phenols and Aldehydes

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An efficient procedure is developed for additive-free condensation of boronic acid with phenols and various aromatic and aliphatic aldehydes under solvent-free conditions.

**Key Words:** Benzodioxaborinine, Boronic acid, Phenols, Aldehydes, Solvent-free.

### INTRODUCTION

Condensation of phenols and aldehydes with boronic acid is a well-known method for the synthesis of dioxaborins. The products are precursors for facile *ortho* substitution of phenols<sup>1</sup>, preparation of quinone methides for Diels-Alder cycloadditions<sup>2</sup> and protection of diols<sup>3,4</sup>. The usefulness of the reaction also arises from the application of the dioxaborins as key intermediates for preparation of a variety of natural and synthetic products such as saligenol derivatives<sup>5</sup>, polycyclic chromans<sup>6,7</sup>, cannabinoids<sup>8</sup>, precocene and robustadiol derivatives<sup>9</sup>, decaline portion of (+)-compactin<sup>10</sup>, (+) decursinol<sup>11</sup> and thielocin<sup>12</sup>.

The scope of the process, primarily reported by Peer under acid catalysis for formaldehyde in refluxing benzene<sup>13</sup>, was later improved by Nagata using optimized reaction conditions and employing other aldehydes<sup>5</sup>. Dufresne *et al.* also offered a more efficient synthetic procedure by using dichlorophenylborane<sup>14</sup>. However, the available methods are either conducted under environmentally unsafe conditions<sup>1,5</sup>, are limited to the condensation of phenols with more reactive aldehydes<sup>14</sup>, or needs labor and time consuming procedures to make the starting reagents<sup>15-17</sup>. Due to environmental and economic reasons, solvent-free reactions have been of huge interest in synthetic organic chemistry in the last two decades<sup>18-21</sup>. In the framework of our investigations on the development of environmentally friendly procedures<sup>22-25</sup>, we recently communicated a solid supported synthesis of dioxaborines under microwave irradiation<sup>26</sup>. We now wish to report a general procedure for the title reaction applicable to the condensation of both aliphatic and various aromatic aldehydes with different phenols in absence of solvent, additive, or external stimulant (**Scheme-I**).

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