A green chemical method for synthesis of bromine-containing “building blocks” for the production of photovoltaic polymers

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Bromine-containing derivatives of aromatic and heteroaromatic compounds are the most important "building blocks" in the assembly of modern Photovoltaic Polymers (PV). While PV is being developed to produce "green" energy, converting sunlight to electricity, the reactions for producing brominated derivatives of building blocks described in the literature are examples of obsolete and environmentally dirty technologies. More environmentally harmful than bromination with molecular bromine [1] can only be bromination by molecular bromine in a concentrated hydrobromic acid medium [2]. Using 1,1'-diphenyl (1), 9H-diphenylcarbazole (2) and thiophene (3) as examples, we successfully tested the bromination of the above objects with a mixture of potassium bromide and bromate in acetic acid as outlined in the diagram.

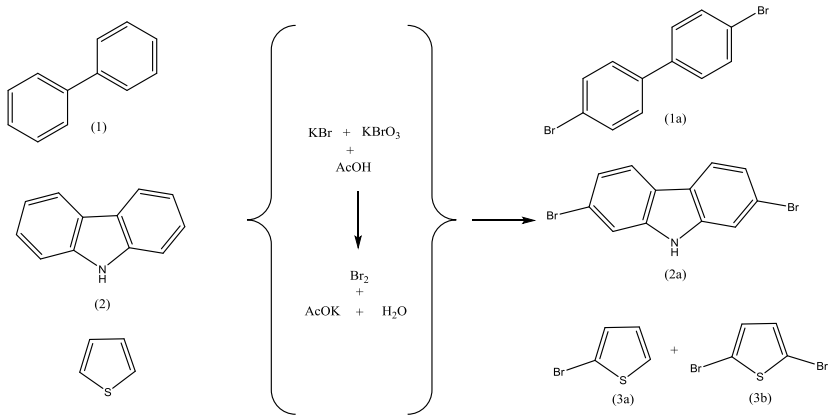

Fig. 17

The reaction is carried out by boiling the brominated substance in acetic acid for 6-8 hours with the regular addition of a dry mixture of bromide and potassium bromate. Outputs of products are comparable with yields in prototype techniques [1, 2]. Bromide and potassium bromide, from which bromine is formed by reaction with acetic acid, are safe and solids under normal conditions, and it is comfortable and safe to work with them. The described method corresponds to the principles of the concept of "Green Chemistry".

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