HYPERVALENT IODINE COMPOUNDS: SYNTHESIS, STRUCTURE AND ITS APPLICATIONS IN AQUEOUS MEDIA

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Nowadays hypervalent iodine chemistry is one of the most attractive fields in chemistry and in science generally. Scientific interest to such compounds is concerned with its unique oxidative properties that let to utilize them in different chemical transformations. The use of water with hypervalent iodine reagents in various reactions instead of substances of heavy metals is a great synthetic tool because they are eco-friendly, easy to handle, nontoxic, able to regenerate [1–3]. All of these beneficial features satisfy the principles of "Green chemistry" [4].

We have developed a new water-soluble oxidizing reagent for convenient iodination of arenes [5], alkenes, alkynes and ketones [6]. Furthermore, the reagent can be efficiently recovered and used again without loses of reactivity.

At that time previously known powerful hypervalent iodine reagent named 2-iodoxybenzenesulfonic acid (IBS) was isolated for the first time. Also simple method for 2-iodosylbenzoic acid (IBS-H) was proposed. [7]

Now we are developing a method of preparation of thia-analogue of famous Zhdankin's and Togni's reagent. According to described data [8] these analogues are potentially more reactive N_3-, CN-, CF_3-transfer reagents than original ones.

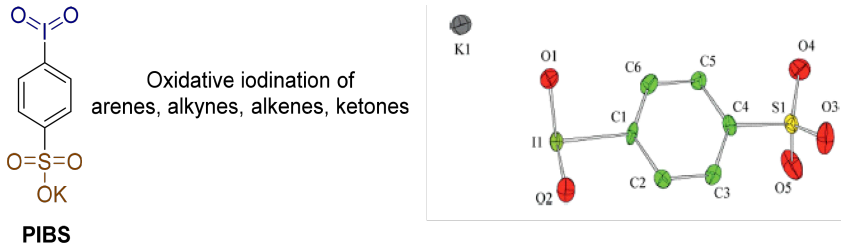

Fig. 1.

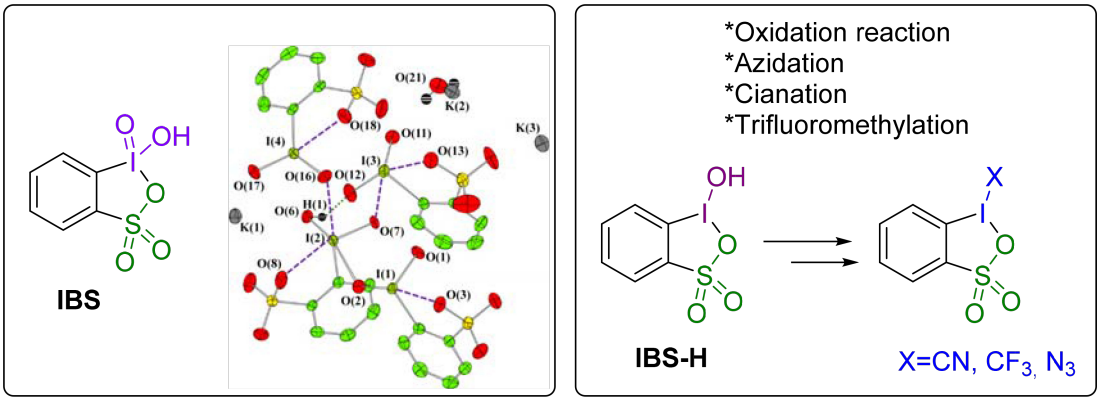

Fig. 2.

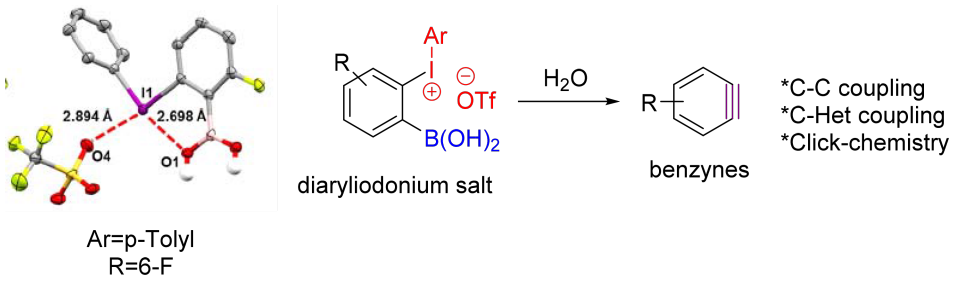

Fig. 3.

Another direction of our work concerns with the investigation of reactivity arylbenziodoxoboroles in presence of water. Arynes can be easily prepared from hypervalent iodine reagents, particularly, from diaryliodonium salts [9]. Some applications of mentioned chemical processes were shown [10].

We have developed an approach to synthesis of interesting class of phosphorous compounds – phosphonium salts – using hypervalent iodine reagent in mild conditions.

Hypervalent iodine compounds can be effectively utilized in various important chemical transformations in the presence of water. Moreover, the processes do not require the use of heavy metals compounds. In addition, water-soluble reagents can be easily regenerated using simple extraction and further oxidation in aqueous media. System of water-hypervalent iodine reagent is a great achievement of organic chemistry that corresponds to "Green chemistry".

Acknowledgements

This work was supported by the Russian scientific foundation project №16-13-10081.

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ASSESSMENT THE INFLUENCE OF CLOSE-CUT DIESEL FRACTIONS ON THE LOW TEMPERATURE PROPERTIES OF STRAIGHT-RUN DIESEL FUEL – DEPRESSANT ADDITIVE BLENDS

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The use of diesel fuel (DF) is growing every year. Use DF as a fuel for heavy-duty truck and technological equipment contributes most to the growth of its consumption. It is also important to note the growth in consumption of winter and arctic brands of DF, which is due to the development of new territories with a harsh climate.

The most effective and economical way to meet the requirements of the standards [1, 2] on low-temperature properties, is to use additives for DF that improve low-temperature properties. However, given the mechanism of action of depressant additives, the interaction between the hydrocarbons in the DF and the additive components may lead to the fact that the use of the additive will not bring the expected improvement in the low-temperature properties of the fuel [3].

The aim of this work is to establish how adding the close-cut diesel fractions influence on the effectiveness of the depressant additive. For the study blends of straight-run diesel fuel with additives (index Ad) and various amounts of light (LFDF) and heavy (HFDF) diesel fractions with boiling range of 180–240 °C and 300–360 °C respectively, were prepared.

The cloud point (CP), cold filter plugging point (CFPP) and pour point (PP), according to the procedures [1, 2], have been determined for the resulting blends. The results are presented in Tables 1, 2.