Table 1. Performance characteristics of dewaxing units

Unit	U1	U2
The volume of raw materials, m^3	684602.4	699518.4
Raw materials consumption, m^3/h (average value)	254.7	260.2
Catalyst volume, m^3	115	80
Average value of raw material density, kg/m^3	847.1	847.7
The average sulfur content, % (in raw materials)	0.851	0.255
The average nitrogen content, ppm (in raw materials)	164.2	61.01
Initial boiling point of fraction, °C (average value)	213	197
Boiling point 50 %, °C (average value)	287	270
Boiling point 96 %, °C (average value)	372	336

ation of the units, the process temperature was increased by 5 °C in both installations.

To compare the deactivation degree of the processes were reduced to one initial conditions using the mathematical model, for which the activity of the catalyst was A = 1.

The change in the activity of the catalyst depending on the weight of the processed raw material by the 1 m^3 volume of the catalyst is shown in Figure 1. It can be concluded from the dependences that the deactivation rate of the catalyst of the U1 is, as expected, slightly higher than at the U2. This is due to the fact that the raw material of the U1 is heavier, more sulfurous, characterized by a greater proportion of nitrogen-containing hydrocarbons, which increase the rate of the catalyst deactivation. In addition, at the end of the period the deactivation degree is only slightly higher at the U2.

At approximately the same degree of deactivation in the unit U2 (in terms of the volume of raw material recycled by the 1 m^3 of the catalyst) were procced 1.5 times more raw materials, then by the unit U1.

References

1. *Ostrovskiy N.M. // Kinetics and catalysis, 2005.– Issue 5.– P.737–748.*
2. *Belinskaya N.S., Ivanchina E.D., Ivashkina E.N., Frantsina E.V., Silko G.Y. // IOP Conference Series: Earth and Environmental Science, 2014.– Vol.21.– Issue 1.– P.1–7.*

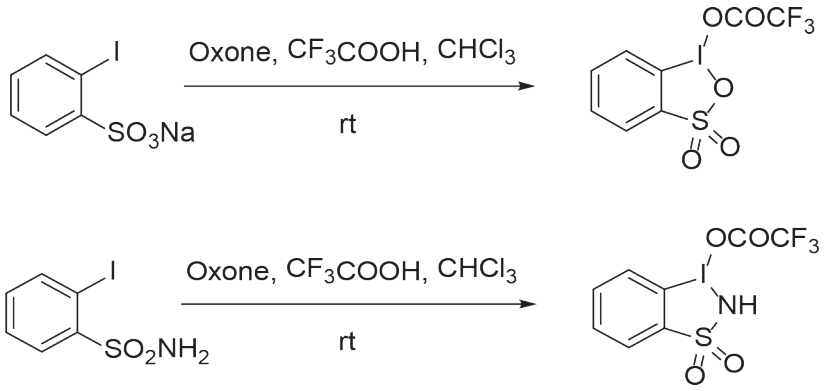
SYNTHESIS OF OXIDIZING REAGENTS BASED ON 2-IODOBENZENESULFONIC ACID

I.A. Mironova
Scientific supervisor – R. Y. Yusubova, PhD in Chemistry
Department of Biotechnology and Organic Chemistry
National Research Tomsk Polytechnic University
634050, Russia, Tomsk, Lenina Av. 30, iam6@tpu.ru

Intensive study of hypervalent iodine derivatives has led to the creation of many reagents based on it, which have different properties, and each of them has its advantages and disadvantages and, therefore, they attract close attention [1–3]. Most of them are eco-friendly and versatile reagents for various synthetically important oxidative transformations [4]. Polyvalent iodine (V) compounds are particularly useful, they are selective oxidants commonly used in the synthesis of natural products [1–4]. However, some of them have significant drawbacks. For instance, 2-iodoxybenzoic acid (IBX) is employed in organic synthesis as highly effective and mild oxidant, but it has low solubility in the most organic solvents except DMSO and has potentially explosive properties [1, 2].

Another representative of cyclic iodylarenes is Dess-Martin Periodinane (DMP) has gained a status of a reagent of choice for selective oxidation of alcohols to carbonyl compounds, especially in complex molecules containing other sensitive functional groups [5]. However, Dess-Martin reagent is less stable and more expensive than IBX.

Ishihara and coworkers researched thia analog



Scheme 1.

of IBX (2-iodoxybenzenesulfonic acid – IBS) [6]. IBS can be used as an extremely active catalyst for selective oxidation of alcohols using Oxone as stoichiometric oxidant. However, 2-iodoxybenzenesulfonic acid is extremely difficult to obtain because of high solubility in water: 2-iodoxybenzenesulfonic acid is vastly contaminated with inorganic impurities.

Also five-membered heterocycles with iodine (III) in the ring are important cyclic λ^3-iodanes. For example, benziodoxoles and benziodazoles are widely applied as reagents of various oxidizing functionalization due to which such functional groups as –F, –Br, $–N_3$, $–CF_3$, –OOR и –CN can be entered to organic compounds [7].

We proposed an enhanced method for IBS preparation without use of organic solvents that can lead to side-reactions. It lets to extract IBS with minimal quantities of inorganic impurities and for the first time to carry out X-ray diffraction.

In addition, we present a new procedure for benziodothioles and benziodothiazoles preparation in trifluoroacetic acid with use of Oxone as oxidant.

Both reagents were obtained for the first time, and subsequently their preparative possibilities will be investigated.

Acknowledgments. This work was supported by a research grant from the Russian Foundation for Basic Research (project 16-53-10046 KO_a).

References

1. *Zhdankin V.V. Hypervalent Iodine Chemistry: Preparation, Structure and Synthetic Applications of Polyvalent Iodine Compounds. John Wiley & Sons: Chichester, 2013.– 468p.*
2. *Zhdankin V.V., Stang P.J. Chemistry of Polyvalent Iodine // Chem. Rev., 2008.– 108.– 5299-5358.*
3. *Hypervalent Iodine Chemistry, (Ed.: T. Wirth), Springer, Berlin, 2003.– 1–4.*
4. *Yusubov M.S., Zhdankin V.V. // Curr. Org. Synth., 2012.– Vol.9.– 247–272.*
5. *Dess D.B., Wilson S.R., Martin J.C. // J. Am. Chem. Soc., 1993.– 115.– 2488−2495.*
6. *Uyanik M., Akakura M., Ishihara K. // J. Am. Chem. Soc., 2009.– Vol.131.– 251–262.*
7. *Yoshimura A., Zhdankin V.V. // Chem. Rev., 2016.– Vol.116.– №5.– 3328–3435.*