ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 8| Issue: 12| December 2022|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2022: 8.205 || ISI Value: 1.188

MODIFICATION OF LIQUID GLASS WITH VARIOUS ORGANIC SUBSTANCES AND INVESTIGATION OF ITS PHYSICO-CHEMICAL PROPERTIES

Kamolova Zaynura Mekhriddinovna[1], Akhmedov Vokhid Nizomovich[2], Olimov Bobir Bahodirovich[3]

[1]*Researcher, Department of Chemistry, Bukhara Engineering and Technology Institute, Uzbekistan, Bukhara.*

[2]*Cand. of Tech. Sciences, Professor of the Department of Chemistry Bukhara Engineering and Technology Institute, Uzbekistan, Bukhara.*

[3]*PhD, docent of the Department of Chemistry Bukhara Engineering and Technology Institute, Uzbekistan, Bukhara.*

ABSTARCT

Today, substances based on silicon and organic compounds are widely used in the chemical industry. From them, modified materials with many properties are synthesized. Such materials are highly resistant to deformation, temperature, fire and various external influences. With this in mind, the modification of liquid glass was carried out with the participation of various local organic raw materials (crotonaldehyde, HYPAN and formaldehyde, active dyes, etc.). The physicochemical properties of liquid glass were studied before and after modification. The areas of use of the obtained modified product were studied.

KEYWORDS: ***refractometer, viscometer, cryoscopy, density, liquid glass, modification, adhesion, cohesion***

INTRODUCTION

Solving the durability problem and improving the physical and mechanical properties of building materials used in the national economy today, as well as obtaining composite materials resistant to chemical effects and using them, is one of the urgent problems[1-3]. According to their mechanical, technical and economic indicators, polymer silicate compositions are actively used in the construction industry. Therefore, a number of studies are being carried out to change the structure and properties of silicate materials by adding polymer additives of different nature. Modification of liquid glass with various substances creates a basis for the use of local raw materials[4-6]. Another way to improve the properties of products made of polymer silicate compositions is to improve their production technology. Today's new trend in the technology of silicate, ceramic and inorganic composites is the creation of materials from solutions by sol-gel processes[6-9]. The essence of such a process is the use of metal oxides and oxyhydrates, which have the ability to transform from liquid systems into solid products[10-12].

MATERIALS AND METHODS

Industrial application finds a method of preliminary preparation of the gel and its subsequent peptization. Sodium silicate and silicic acid are reacted to obtain sol from silicates. After the mixture is washed from the salts formed by the reaction, the newly precipitated gel is mixed with an aqueous solution of ammonia. The resulting mixture is peptized under a temperature and pressure of 185-195 °C. In the ash stabilized with alkali to pH 7.8-8, polymerization proceeds to a certain value corresponding to a specific surface area of 480-510 m^2/g, which corresponds to a particle size of 4÷5.5 mm. The polycondensation reaction between the silanol groups during the aging process of the sol leads to an increase in pH. A number of physicochemical properties of the polycondensation product obtained in the presence of liquid glass with croton aldehyde and HYPAN were investigated.

RESULTS

Viscosity and light absorption index of modified liquid glass were determined in laboratory conditions. For this, refractometer (DR301-95) and automatic viscosity determination (HAAKE viscotester 1 plus and 2 plus) devices were used. The obtained results are presented in Tables 1 and 2.

ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 8| Issue: 12| December 2022|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2022: 8.205 || ISI Value: 1.188

Table 1.
Concentration dependence of viscosity of liquid glass modified with HAAKE viscometer

Modified liquid glass	Temperature, °C	Solution concentration, %	Viscosity, dPas
Liquid glass+croton aldehyde+HYPAN	29.6	25	0.04
Liquid glass+croton aldehyde+HYPAN	29.4	30	0.05
Liquid glass+croton aldehyde+HYPAN	29.5	50	0.08
Liquid glass+croton aldehyde+HYPAN	29.5	75	1.48
Liquid glass+croton aldehyde+HYPAN	29.7	90	1.56

Table-2.
Light absorption indicators of modified liquid glass solutions with different concentrations at 28 °C

Modified liquid glass	Temperature, °C	Solution concentration, %	Light absorption, nD
Liquid glass+croton aldehyde+HYPAN	28	10	1.3945
Liquid glass+croton aldehyde+HYPAN	28	20	1.3865
Liquid glass+croton aldehyde+HYPAN	28	30	1.3798
Liquid glass+croton aldehyde+HYPAN	28	40	1.3760
Liquid glass+croton aldehyde+HYPAN	28	50	1.3664
Liquid glass+croton aldehyde+HYPAN	28	60	1.3597
Liquid glass+croton aldehyde+HYPAN	28	70	1.3537
Liquid glass+croton aldehyde+HYPAN	28	80	1.3430

As can be seen from the above tables, the viscosity and light absorption indicators of the modified products of liquid glass changed depending on the concentration. The viscosity increased to 0.04 dPas when the concentration was 25%, and to 1.56 dPas when it was 90%. The light absorption index changed from 1.3945 nD when the concentration was 10% to 1.3430 nD when it was 80%. As a result, the concentration increased, the viscosity increased, and the light absorption index decreased.

CONCLUSION

In conclusion, it can be said that today the use of polymer materials based on water-soluble silicates with organic additives, resistant to acidic and neutral environments and high temperature effects, has begun to develop. Such polymers are cheap, easy to manufacture, non-toxic and, most importantly, non-flammable. There is a certain perspective for organic matter and liquid-glass based bonding composite materials.

Список литературы

1. *Ostonov Firuz, Akhmedov Vohid. Synthesis of ionites based on cremnisole // Universum: технические науки. 2022. №4-13 (97).*
2. *Остонов Ф.И., Ахмедов В.Н. Производство новых видов гибридных композитов// Научный вестник НамГУ . 2021/9 №9 –с. 44-48*
3. *Остонов Ф.И., Ахмедов В.Н., Дустов Х.Б. Получение модифицированных акриловых соединений на основе соединений кремния// Фан ва технологиялар тараққиёти научный вестник. 2021. №2 –с. 24-30*
4. *Остонов Ф.И., Ахмедов В.Н. Винилморфолин иштирокида гибрид полимер композит олиш // Замонавий кимёнинг долзарб муаммолари. Конференция. 2020/12/4 –б. 404-405*
5. *Остонов Ф.И., Ахмедов В.Н. Гибридные композиты на основе морфолина// «Modalităţi conceptuale de dezvoltare a ştiinţei moderne» Том 2. Конференция. 2020/11/20 -С. 38-42*
6. *Остонов Ф.И., Ахмедов В.Н. Синтез ионитов на основе кремнезоля и олигополимеров// «Инновационные технологии переработки минерального и техногенного сырья химической, металлургической,*

ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 8| Issue: 12| December 2022|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2022: 8.205 || ISI Value: 1.188

нефтехимической отраслей и производства строительных материалов» Конфренция. 2022/5/12. – С. 112-114

7. *B.B. Olimov, V.N. Akhmedov, G.A. Gafurova. Application of derivatives of diatomic phenols as corrosion inhibitors. Euro Asian Conference on Analytical Research (Germany) ISBN: 978-1-913482-99-2. 2021. 15 October. p. 136-138.*
8. *Олимов Б.Б., Гафурова Г.А., Кудратов О.Х. Production and properties of corrosion inhibitors in the oil and gas industry // Universum: химия и биология: электрон. научн. журн. 2022. 2(92). URL: https://7universum.com/ru/nature/archive/item/13009*
9. *Olimov B., Akhmedov V., Gafurova G. Production and use of corrosion inhibitors on the basis of two-atomic phenols and local raw materials // Universum: химия и биология : электрон. научн. журн. 2021. 11(89). URL: https://7universum.com/ru/nature/archive/item/12473*
10. *Olimov B.B., Sadiqova M.I., Beshimov I.A. Technology of obtaining effective corrosion inhibitors in the oil and gas industry // Universum: технические науки: электрон. научн. журн. 2022. 1(94). URL: https://7universum.com/ru/tech/archive/item/12950*
11. *Олимов Б.Б. [и др.]. Synthesis and properties of nitrogen-retaining corrosion inhibitors//Universum: химия и биология : электрон. научн. журн. 2022. 4(94). URL: https://7universum.com/ru/nature/archive/item/1330*
12. *Olimov B. B., Yoldosheva N. J. Gravimetric study of the mechanism of action of corrosion inhibitors used in the oil and gas industry //Международный научно-образовательный электронный журнал «Образование и наука в xxi веке». Выпуск. – №. 19.*