Aromatik oligoefirlar sintezi va xossalari

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Annotatsiya: Bugungi kunda texnikaning turli sohalari uchun yuqori olov - va issiqlik bardoshlikka yaxshi fizik - mexanik xossalar bilan birgalikda ega bo'lgan termobarqaror polimerlarni yaratish muammosi juda muhimligi sababli, dastlabki moddalar tuzilishiga qarab oligosulfonketon, oligosulfon, oligoketon va oligoformallar asosida sopoliefirlar va blok - sopoliefirlarning hosil bo'lish qonuniyatlarini o'rganish, sopolimerlarning tuzilishi, tarkibi va xossalari orasidagi bog'liqliklarni aniqlash ilmiy va amaliy nuqtai - nazardan muhim bo'lib hisoblanadi.

Kalit so'zlar: oligosulfonketonlar (OSK), oligoketonlar (OK), oligosulfonlar (OS), dimetilsulfoksid (DMSO), polikondensatsiya darajasi, dinatriyli tuz, dipolyar erituvchi

Synthesis and properties of aromatic oligesters

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Abstract: Due to the fact that the problem of creating thermostable polymers with high fire resistance and good physical and mechanical properties is very relevant today for various fields of technology, depending on the structure of the starting materials, the production of copolyesters and block copolyesters based on oligosulfoneketone, oligosulfone, oligoketone and oligoformal. It is important from a scientific and practical point of view to study the laws of formation, to determine the relationship between the structure, composition and properties of copolymers

Keywords: oligosulfoketones (OSK), oligoketones (OC), oligosulfones (OS), dimethyl sulfoxide (DMSO), degree of polycondensation, disodium salt, dipolar solvent

Hozirgi zamon sanoatining turli sohalarida poliarilat, polisulfon, poliketonga o‘xshagan polimer materiallar keng qo‘llanib kelinmoqda. Ularning har biri ma’lum afzallik xossalar bilan tafsiflanadi. Shu bilan birga ular ba’zi kamchiliklarga ham ega. So’ngi paytlarda bitta materialda turli sinf polimerlarining ijobiy sifatlarini mujassam qilish uchun zanjirida shu sinf polimerlari zvenolarini saqlagan oligomerlar keng qo‘llanila boshlandi.

Masalan, polisulfon yoki poliefirketonlarning u yoki bu xossalarini yaxshilash maqsadida hozirgi vaqtda bir qator blok-sopolimerlar yaratilgan va ularning xossalari o‘rganilgan. Ular hozirgi zamon sanoatining turli sohalari uchun konstruksion va elektroizolyatsion vazifali issiqbardosh materiallar sifatida muhim ahamiyatga ega.

Hozirgi kunda yuqori molekulyar massali, olovbardosh, yuqori fizik-mexanik xossali sopoliefirsulfonketon va sopoliformallarni olish maqsadida turli tuzulish va polikondensatsiyalanish darajasiga ega bo‘lgan oligosulfonketonlar (OSK), oligoketonlar (OK) hamda oligosulfonlar (OS) sintez qilingan.

Oligosulfonketon, oligoketon, oligosulfon va oligoformallar sintezi yuqori haroratli polikondensatsiyalanishi bilan aproton dipolyar erituvchi - dimetilsulfoksid (DMSO) muhitida inert gaz (azot) atmosferasida o‘tkazilgan.

Aromatik oligoefirlar - oligosulfon, oligoketon va oligoformallarning ba’zi bir xossalari 1 - 4 jadvalda keltirilgan.

1 - jadval

Aromatik oligoketonlarning xossalari

Oligoketonlar	Polikonden-satsiyalanish darajasi	η dl/g	Chiqishi, %	Yumshash harorati, °C	Hisoblangan mol.massa	Oxiridagi OH guruhlar miqdori, %**	
						Hisoblangan	Topilgan
OK - 1D	1	0,04	98	129-135	635	5,35	5,40
OK - 3D	3	0,08	98	139-146	1148	2,35	2,10
OK - 5D	5	0,12	98	147-152	2261	1,50	1,60
OK - 7D	7	0,14	98	154-157	3074	1,11	1,05
OK - 10D	10	0,16	99	160-165	4293	0,79	0,82
OK - 20D	20	0,18	99	167-175	8358	0,40	0,45
OK - 1F	1	0,03	98	196-200	815	4,17	4,20
OK - 5F	5	0,06	98	210-215	2801	1,21	1,20
OK - 10F	10	0,11	99	237-244	5284	0,64	0,65
OK - 20F	20	0,16	99	255-260	10249	0,33	0,30

*Oligosulfonlarni belgilashda raqamlar - polikondensatsiyalanish darajasining o‘rtacha qiymati D - dian xosilalari, F - fenolftalein hosilalari

**Verley bo‘yicha titrlash bilan topilgan

2 - jadval

Aromatik oligosulfonlarning xossalari

Oligosulfonlar	Polikonden-densatsiya darajasi	η dl/g	Chiqishi, %	Yumshash harorati,°C	Hisoblanga mol massa	Oxiridagi OH guruhlar miqdori, % **	
						Hisoblangan	Topilgan
OS - 1D	1	0,02	98	85-88	671	5,00	5,08
OS - 3D	3	0,06	98	106-147	1556	2,32	2,36
OS - 5D	5	0,11	98	155-162	2441	1,39	1,32
OS - 7D	7	0,12	99	173-178	3326	1,02	1,06
OS - 10D	10	0,13	98	177-183	4654	0,73	0,78
OS - 20D	20	0,24	98	185-186	9078	0,38	0,32
OS - 1F	1	0,02	98	202-205	851	4,00	4,03
OS - 10F	10	0,14	99	262-269	5645	0,60	0,64
OS - 20F	20	0,25	99	292-300	10970	0,31	0,29

* Oligoketonlarni belgilashdagi raqamlar - polikondensatsiya darajasining o‘rtacha qiymati n, D - dian hosilalari, F - fenolftalein

** Verley titrlash orqali topilgan

3- jadval

Aromatik oligosulfonketonlarning xossalari

Oligosulfon-ketonlar	Polikonden densatsiya darajasi	η dl/g	Chiqishi, %	Yumshash harorati, °C	Hisoblangan mol massa	Oxiridagi OH guruhlar miqdori, %**	
						Hisoblangan	Topilgan
OSK - 1D	1	0,06	98	137-143	1077	3,15	3,20
OSK - 3D	3	0,11	98	145-150	2775	1,22	1,20
OSK - 5D	5	0,15	98	152-157	4473	0,76	0,80
OSK - 7D	7	0,18	99	164-168	6171	0,55	0,53
OSK - 10D	10	0,19	98	170-176	8718	0,39	0,30
OSK - 20D	20	0,22	99	179-194	17209	0,20	0,18
OSK - 1F	1	0,04	98	198-206	1347	2,52	2,62
OSK - 5F	5	0,06	98	224-240	5464	0,62	0,60
OSK - 10F	10	0,11	99	256-263	10609	0,32	0,35
OSK - 20F	20	0,13	99	263-271	20900	0,16	0,20

*Oligosulfon ketonlarini belgilashdagi raqamlar - polikondensatsiya darajasining o‘rtacha qiymati n, D - dian hosilalari, F - fenolftalein

** Verley titrlash orqali topilgan

4 - jadval

Aromatik oligoformallarning xossalari.

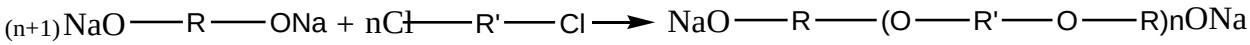
Oligoformallar	Polikonden-densatsiya darajasi	η dl/g	Chiqishi, %	Yumshash harorati, °C	Hisoblangan mol massa	Oxiridagi OH guruhlar miqdori, %**	
						Hisoblangan	Topilgan
OF - 1D	1	0,07	98	44-46	470	7,2	7,8
OF - 5D	5	0,08	98	48-52	1430	2,3	2,6

OF - 10D	10	0,18	97	54-57	2631	1,2	1,6
OF - 20D	20	0,23	97	140-145	5034	0,7	0,9
OF - 1F	1	0,07	98	48-51	650	5,2	5,6
OF - 5F	5	0,08	98	68-72	1970	1,7	1,9
OF - 10F	10	0,19	97	103-106	3622	0,9	1,3
OF - 20F	20	0,25	97	155-160	6925	0,5	0,9

Oligoformallarni belgilashdagi raqamlar - polikondensatsiya darajasining o‘rtacha qiymati n, D - dian hosilalari, F - fenolftalein

** Verley titrlash orqali topilgan

Dinatriyli tuz NaOH eritmasi va bisfenolning 2 : 1 molli o‘zaro nisbatida o‘zaro ta’sirlashishning birinchi bosqichida hosil qilinadi. So‘ngra yuqori haroratli polikondensatsiyalanish usuli bilan difenolyat va tegishli diarilgalogenid o‘rtasida reaksiya o‘tkaziladi. Oligosulfon, oligosulfonketon va oligoketonlar sintezining umumiy sxemasini quyidagicha ifodalash mumkin:



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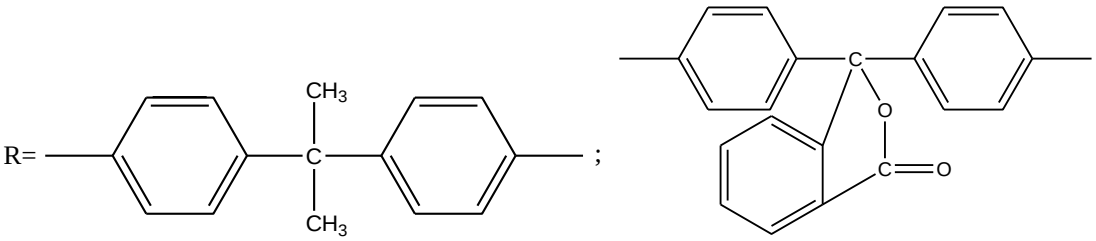
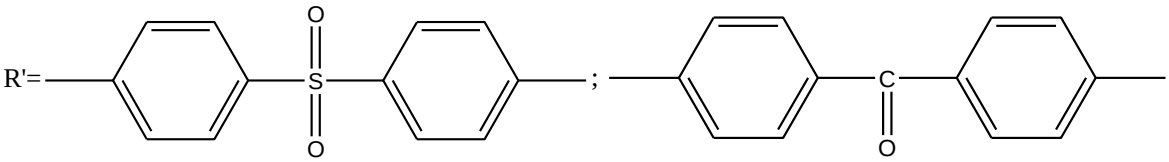
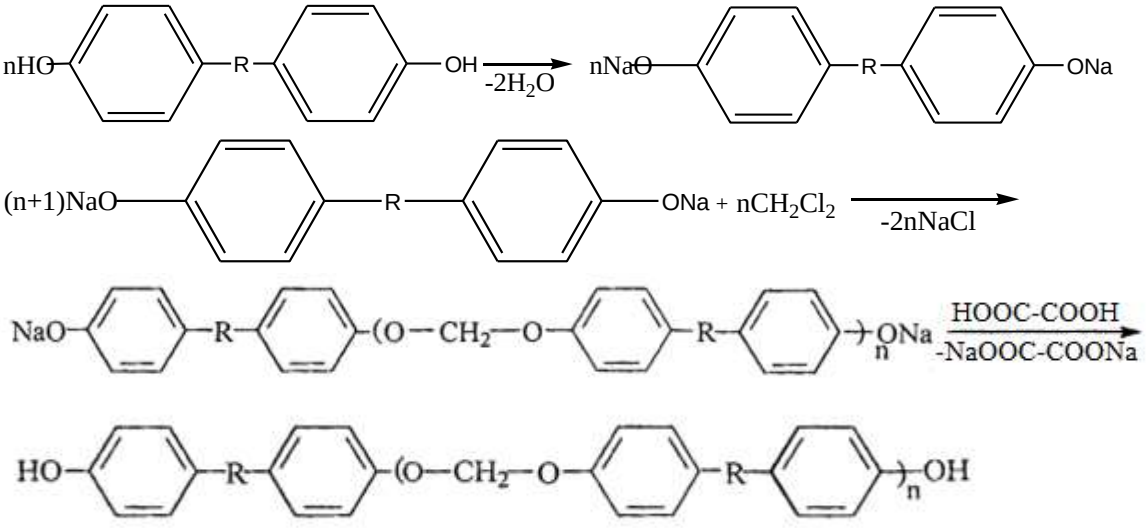


yoki



Yoki ularning ekvimolekulyar aralashmasi (1 : 1)

Aromatik oligoformallar quyidagi umumiy sxema bo‘yicha olindi:



Oligosulfonketon, oligosulfon va oligoketonlarning tuzilishi element tahlil natijalari 5 - jadval va IQ spektroskopiya bilan tasdiqlanadi. IQ spektrlarda 930, 1015,

1045 sm^{-1} sohada oddiy efir bog‘larga, 1290, 1365, 1385, 1415 - 1485, 2930 - 2980 sm^{-1} sohada dian qoldig‘idagi izopropilliden guruhiga (dian oligormerlari holida), 1750 - 1780 sm^{-1} sohasida lakton guruhiga (fenolftalein oligomerlari holida), 3600 - 3200 sm^{-1} gidroksil guruhlariga, 1150 - 1170, 1315, 1245 - 1295, 1320 sm^{-1} sulfonil guruhiga (oligosulfonlar uchun) va 1610 - 1650 sm^{-1} ketonguruhga mos keladigan yutilish polosalarining mavjudligi oligosulfonketon, oligosulfon va oligoketonlarning hosil bo‘lishi to‘g‘risida dalolat beradi.

5 - jadval

Oligosulfon, oligoketon va oligosulfonketonlar element tahlili.

Oligoefirlar	Hisoblab chiqilgan, %			Topilgan, %		
	C	H	S	C	H	S
OS - 1D	75,01	5,80	4,50	75,20	5,71	4,78
OS - 5D	73,80	5,20	6,57	74,06	5,02	6,59
OS - 10D	73,56	5,11	6,89	73,59	5,07	7,03
OS - 20D	73,42	5,06	7,06	73,54	5,09	7,18
OS - 1F	73,40	4,03	3,77	73,69	4,27	3,79
OS - 10F	72,35	3,82	5,68	72,39	3,91	5,72
OS - 20F	72,26	3,80	5,85	72,30	3,76	5,91
OK - 1D	81,20	6,01	-	81,36	6,03	-
OK - 5D	82,35	5,62	-	82,41	5,60	-
OK - 10D	82,53	5,54	-	82,56	5,49	-
OK - 20D	82,63	5,50	-	82,66	5,47	-
OK - 1F	78,12	4,20	-	78,15	4,16	-
OK- 10F	79,56	4,08	-	79,60	4,04	-
OK - 20F	79,56	4,07	-	79,62	4,03	-
OSK - 1D	78,04	5,61	2,97	78,22	5,55	3,00
OSK - 5D	77,86	5,32	3,58	77,92	5,28	3,66
OSK - 10D	77,84	5,27	3,67	77,76	5,22	3,71
OSK - 20D	77,82	5,25	3,72	77,72	5,20	3,82
OSK - 1F	75,77	4,04	2,37	77,65	4,00	2,45
OSK - 5F	75,82	3,95	2,93	75,84	3,90	3,11
OSK - 10F	75,84	3,93	3,02	75,79	3,89	3,09
OSK - 20F	75,86	3,92	3,06	75,81	3,85	3,16

*Oligoefirlarni belgilashdagi raqamlar polikondensatsiya darajasi p ning o‘rtacha qiymati, D - dian, F - fenolftalein hosilasi.

Olingan oligoformallar tuzilishi ham element tahlil natijalari (6 - jadval) bilan tasdiqlanadi.

6 - jadval

Oligoformallarning element tahlili.

Oligoformallar *	Hisoblab chiqilgan, %		Topilgan, %	
	C	H	C	H
OF-1D	79,46	6,88	79,29	6,83
OF-5D	79,80	6,76	79,75	6,80
OF-10D	79,88	6,74	79,93	6,81
OF-20D	79,93	6,73	79,77	6,89
OF-1F	75,92	4,35	75,80	4,40
OF-5F	76,21	4,29	76,15	4,37

OF-10F	76,28	4,29	76,23	4,31
OF-20F	76,31	4,28	76,27	4,29

*Oligoformallarni belgilashdagi raqamlar - Polikondensatsiyalanish darajasining o‘rtacha qiymati, D - dian, F - fenolftalein hosilasi.

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