Другим немаловажным параметром, характеризующим устойчивость комплексов к действию внешней среды (растворитель, фоновый электролит, температура), является изменение энтропии. Так, для ионов никеля в реакциях с дибутилдитиофосфатом калия при низких ионных силах положительные значения энтропии свидетельствуют о стабилизации комплексов молекулами воды в меньшей степени, чем для ионов меди [10]. Поэтому образование связи собирателя с ионами никеля протекает с меньшими энергетическими затратами, чем для ионов меди. Учитывая все изложенное выше, можно предположить, что именно прочность связи металл–лиганд (флотореагент) определяет вероятность флотирования минералов, а следовательно, и эффективность флотации.

Таким образом, в результате проведенных исследований были определены константы устойчивости комплексов ионов переходных металлов с дибутилдитиофосфатом калия. Выявлено, что присутствие сильного электролита оказывает существенное влияние на процесс комплексообразования и на поведение комплексов в растворе. Анализ термодинамических параметров показал, что дибутилдитиофосфат калия является селективным собирателем к ионам никеля. Также на основании температурной зависимости констант стабильности комплексных солей переходных металлов рассчитаны изменения термодинамических параметров, причем основной вклад в энергию Гиббса вносит энтропийная составляющая.

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M.I.Baikenov[1], G.G.Baikenova[1], A.B.Tateeva[1], A.K.Moldabaev[3], R.Nuerzai[2], G.K.Kudaibergen[1], D.R.Zhienbaeva[1], A.Tusiphan[1]

[1]Karaganda State University named after E.A.Buketov;
[2]Xinjiang University, Urumqi 830046, China;
[3]Kazakhstan State University named after Al-Farabi, Almaty

STUDY OF NATURAL FRUIT SHELL OF CARBONAZATION AND ITS APPLICATION IN THE TRACE METALS ABSORPTIONS (II)

Әр түрлі металл иондарының байыту мен таңдамалы абсорбциясын қарастыратын эксперименталды фактілер көрсеткендей, 600 °C температурада цеолит карбон адсорбентте асыл металл Au табылды, бұл жоғары адсорбция кезіндегі селективті байыту болып табылады.

Экспериментальные факты, рассматривающие обогащение и селективную абсорбцию различных металлических ионов, показывают, что при температуре 600 °C в карбонизации винограда на адсорбенте цеолит-карбон находят драгоценный металл Au, что дает уникальный ориентир и селективное обогащение (при очень высокой адсорбции).

Because of the natural fruit of many chemical constituents of the material for the carbon, and carbon molecular sieve is a well-developed pore structure, immense surface area and good adsorption properties of carbon material. In the chemical, fine chemical products, petrochemical and metals industries need to purify high-quality, special activated carbon to complete their product filtration, adsorption, separation [1–2] processes or detreated literature at home and abroad have been reported Especially in the orientation Absorption of trace metals, precious metals tailings trace enrichment, litter Living Absorption of trace heavy metals and other special fields, with the rapid economic development, China's natural fruit putamen unique orientation Absorption of activated carbon (carbon molecular sieve) the demand for more and more large, high-quality, special activated carbon development and market prospects are very broad.

Author study and explore the carbonization temperature at the same time natural fruit putamen (walnut shells and grape nuclear) Absorption of different metals and concentration, trying to find out the scope of the trace (less than 0.5mg / L) effectively Absorption and accumulation of valuables metal adsorbent.

1. Experimental part

1.1 Adsorbent Preparation and performance testing. The use of 300–600 °C carbonation putamen natural fruit smash charcoal to less than 300~500 µm, add binder be mixed after the extrusion molding, drying, electric converter tube placed in nitrogen under the protection of the use of natural gas carbonization, heating conditions heating rate 15 °C/min, end temperature 600 °C, constant temperature time 30 min, at nitrogen cooling has been under the protection of the natural fruits of carbonation putamen (carbon molecular sieve). Using Micromeritics ASAP 2000 automatic adsorption samples for determination of nitrogen adsorption isotherms (73 K), by BET method to calculate the sample volume and specific surface area.

1.2 Preparation of metal ion solution. Cu(II), Cd(II), Ni(II), Co(II) and Pb(II) solution preparation: the exact sequence that take a variety of metal ions on nitrate (A.P), in the beaker 100 ml add 10 ml of aqueous solution containing nitric acid, the question is completely dissolved, the volume deionized water, a metal ion concentration of 20 mg/L solution ready. Au solution preparation: an accurate check, Hydrochloroauric acid ($HAuO_4 \cdot 4H_2O$/S.P), in 0,2 N HCl beaker add 10 ml, to be completely dissolved, deionized water volume, the concentration of Au was 0,1–1,0 mg/L ready solution. With SHIMASTU-667 atomic absorption spectrometer samples were absorption determination of the content in a variety of metal ions.

2. Results and Discussion

2.1 Carbonization temperature putamen at the same time the natural fruit of the physical parameters. Table 1 shows the temperature at the same time natural carbonation of the fruits of the physical parameters of the nuclear shell, grape and walnut shell nuclear surface area, pore volume and water absorption varied widely, illustrated at carbonation process, the molecular sieve carbon yield due to ash General to decide how much [3]. Grape nuclear carbon molecular sieve pore and developed low-ash of the 600 °C natural fruit putamen carbon molecular sieve with the largest surface area and the best performance of air separation, the carbonization temperature of 600 °C for the production of natural fruit putamen optimum temperature carbon molecular sieve. Therefore approved as a natural fruit shell Preparation of activated carbon or carbon molecular sieve precursor, wood vinegar, wood tar can be further processed and prepared a variety of chemical products, high gas, calorific value, suitable as a civilian gas[4].

Table 1

Different natural of the nuclear shell fruit carbonation temperature the physical parameters

$T_{carb.}$, °C	Adsorbent	Density, g/ml	Hole capacity, %	Hygroscopicity, %	Surface area, cm^2/g
600	Nuclear grapes	1,64	72,35	92,66	780
	Walnuts nuclear	1,09	45,36	63,75	650
300	Nuclear grapes	1,23	55,18	69,48	600
	Walnuts nuclear	0,87	36,39	47,62	475
25	Nuclear grapes	0,82	38,02	46,30	420
	Walnuts nuclear	0,65	27,42	31,50	300

2.2 Carbonization natural fruit putamen volume of adsorbent on adsorption of metal enrichment. Through carbonization temperature 600 °C natural fruit putamen carbon molecular sieve adsorption of different metal ions adsorption capacity of observation, the adsorption capacity is at 50 % or more. Table 2 lists the carbonization temperature at 600 °C when the natural fruit putamen volume of adsorbent for metal adsorption. Grape nuclear molecular sieve carbon for heavy metals (Pb) adsorption capacity greater than 55 %, and on other metals Absorption weak. Carbon molecular sieves from walnut shells of heavy metals (Pb) Absorption weak, and on other metal adsorption capacity greater than 50 % of the Ni metal adsorption close to 90 %.

Table 2

Carbonation temperature 600 °C the natural fruit of the metal shell of the adsorbent adsorption

Adsorbent	Time, min	Measured values of metal ions, mg/l				
		Pb	Co	Ni	Cd	Cu
Walnuts nuclear	–	11,6	6,0	7,1	7,5	9,3
	5	3,6	2,0	6,4	4,7	0,9
	15	2,7	3,5	5,4	4,8	2,0
	30	2,5	3,1	5,0	2,6	5,9
	45	3,8	1,0	5,3	3,2	5,1
Nuclear grapes	–	11,0	5,3	7,6	0,4	9,8
	5	7,6	1,7	2,8	0,15	3,3
	15	7,3	2,6	4,2	0,2	3,3
	30	7,4	2,8	4,5	0,2	3,4
	45	7,2	3,1	4,7	0,3	3,7

Authors studied the carbonization temperature of 600 °C at the time of grape nuclear carbon molecular sieve adsorbent for heavy metal adsorption capacity greater than 55 %, and on, especially for traceother metals absorption weak notable feature [5], precious metals (Au) were absorption enrichment research (Au volume at 0,24 mg/L range), can be seen from figure 1, grape nuclear molecular sieve carbon, molecular sieve carbon nuclear walnut and wood, compared to when zeolite, carbon molecular sieve carbon nuclear grapes on the trace of the Au has unique orientation and selective enrichment of a very high adsorption, and other adsorbents are not similar orientation is very high enrichment and selective adsorption.

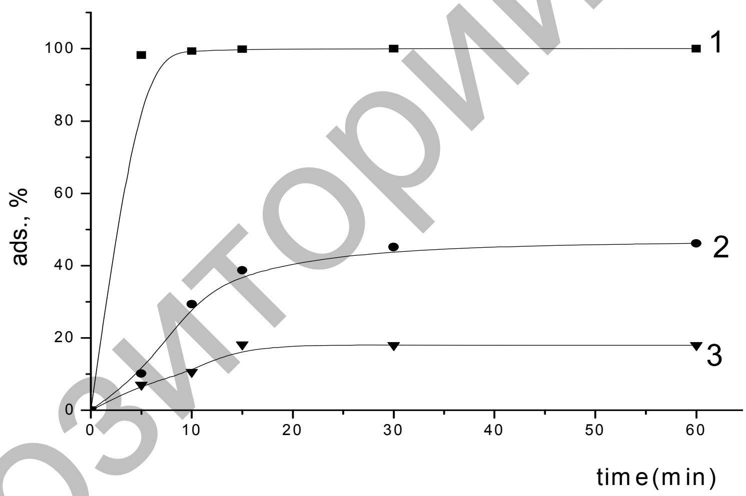

Fig. 1. Carbonation temperature 600 natural zeolite carbon absorption of the metal Au changes with time

By summing up the experimental results can be drawn the following conclusions:

1. Carbonation natural fruit putamen carbon molecular sieve is a well-developed pore structure, immense surface area and good adsorption properties of carbon materials.

2. There is a unique orientation is very high enrichment and selective adsorption performance of trace precious metals may have do not know the structure of existence, pending further experimental study.

3. Carbonization temperature of 600 °C at the time of grape nuclear carbon molecular sieve adsorbent of trace precious metals Au has a unique orientation and selective enrichment of a very high adsorption.

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M.I.Baikenov[1], Zhou Jian-lin[2], Ma Feng-yun[2], Zhou Qi-xiong[2], Guo Jing[2], G.G.Baikenova[1], A.K.Moldabaev[3], G.K.Kudaibergen[1], D.R.Zhienbaeva[1], A.Tusiphan[1]

[1]Karaganda State University named after E.A.Buketov, Kazakhstan;
[2]Xinjiang University, Urumqi 830046, China;
[3]Kazakhstan State University named after Al-Farabi, Almaty

CO-LIQUEFACTION OF HEISHAN COAL AND RESIDUE OIL WITH BOILING TEMPERATURE >520 °C

Хейшан көмірдің сұйылтуы 1 л сыйымдылықты автоклавта, Е/К = 2, қысым 6,0 МПа, катализатор ретінде Fe_2O_3&S қолданылып жүргізілді. Еріткіш/көмір тең екі кезінде жанар майдың шығуы (68 %) максималды, еріткіш сұйылту кезінде жанар май шығуы (19 %) минималды болады. Нәтижелер көрсеткендей, еріткіш/көмір қатынасы және қысым маңызды көрсеткіштер болып табылады. Хейшан көмірінің сұйылту температурасы 400 °С-дан жоғары болуы мүмкін.

Ожижение Хейшанского угля было выполнено в автоклаве вместимостью 1 л при отношении Р/У = 2, давлении 6,0 МПа, и использовании катализатора Fe_2O_3&S. Максимальный топливный выход (68 %) был получен при соотношении Р/У = 2. Как показывают результаты, отношение Р/У и давление являются важными факторами. Температура ожижения Хейшанского угля может быть выше 400 °С.

1. Introduction

Energy sources are the need of modern civilization. Petroleum and petroleum based oils are the key sources used for power generation in the premium market i.e. as traffic fuels. Other alternative fuels are being researched recently to reduce the reliance on petroleum based oils. However, they will be in the center of the energy scene in the future. Keeping in view the heralding oil crises, there is a need to focus on carbonaceous candidate materials for conversion in to highly demanding liquid fuels. Coal is the most plentiful and versatile fuel available on earth which becomes very important both sources of energy and organic feedstock in the 21st century. There are several ways to get chemicals and synthetic fuels through coal conversing [1–5]. Coal directly liquefaction is one of the ways of coal conversion getting useful products.

2. Experimental

2.1 Materials. Basis on an iron-catalyst, Fe_2O_3 mixing with S were used in this work. The chemicals used in Experiment such as Fe_2O_3, S, *n*-hexane, toluene, THN and THF was purchased from market, and they were needn't to preparation.

Coal sample was supplied by Heishan coal mine of Shenhua Group. Residue oil was supplied from petroleum of DuShanZi in Xinjiang, China. Autoclave was made in DaLian, China. Analysis results of the samples of coal and residue oil are summarized in Table 1 and 2, respectively. Tetralin (THN) was used as liquefaction solvents.

Table 1

The proximate and ultimate analysis of coal sample, w_t %, daf

Coal sample	Proximate analysis				Ultimate analysis					H/C
	M	A_d	V_{daf}	FC^a	C	H	O^a	N	S	
Heishan	4,78	3,28	34,18	57,76	70,48	3,50	16,75	1,00	0,21	0,60

a: By difference.