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APPENDICES

Appendix A Raw Data

Table A1-1 Effect of pH on gel time obtained at the R_H of 587 and 1320

pH	Gel Time (s) at R_H 587	Gel Time (s) at R_H 1320
8	60	10
9	10	10
10	10	10
11	10800	9600
12	10800	9600
13	7200	3600
14	7200	3600

Table A1-2 Effect of the R_H on gel time obtained at pH 11-12 and 13-14

R_H	Gel time (s) at pH 11-12	Gel time (s) at pH 13-14
352	12000	9000
587	10800	8400
882	7200	4200
1320	9000	4200
1760	5400	4800

Table A1-3 Textural properties of zirconias calcined at 600° C

pH	R_H	S_{BET} (m^2/g)	Vp (N_2) (cm^3/g)	dp (A)
7-8	352	24	0.056	86.7
	587	20	0.048	95.8
	882	19	0.047	
	1320	22	0.05	92
9-10	352	50	0.05	46
	587	55	0.057	40.3
	882	43	0.04	50.4
	1320	45	0.057	48.6
11-12	352	110	0.07	26
	587	125	0.077	24.8
	882	90	0.06	30.5
	1320	105	0.073	28.3
13-14	352	45	0.042	45.6
	587	50	0.055	43.7
	882	52	0.05	44.6
	1320	44	0.04	45.2

Note : R_H = molar water to precursor ratio

S_{BET} = BET surface area

Vp (N_2) = Total pore volume

dp = Average Pore diameter

Appendix B Calculations

B 1 Calculation of 100 % yield of catalyst

Using precursor = 1 gm

Mw. of Sodium Tris(glycozirconate) = 317

Mw. of zirconia = 123

Basis 1 gm of precursor

Zr mass balance

317 gm. of Sodium Tris(glycozirconate) contain 91 gm. of Zr

So 1 gm. of Sodium Tris(glycozirconate) contain 0.2870 gm. of Zr

100 % yield of catalyst

91 gm. of Zr can produce 123 gm. of ZrO_2

So 1 gm. of Sodium Tris(glycozirconate) that contain 0.2870 gm. of Zr can be produce 0.3879 gm. of ZrO_2

100 % yield of ZrO_2 = 0.3879 gm.

Table B 1-1 Sodium removal from gel formed with the R_H of 587 at pH 9-10

Washing Times	Weight of cat.(gm)	% yield of cat.	%weight loss	% Na content
0	0.3563	100	0	10
3	0.3426	96.1549	3.8450	0.83
5	0.3220	90.3732	9.6267	0.68
7	0.3095	86.8650	13.1349	0.38
10	0.2921	81.9814	18.0185	0.35

Appendix C Experimental Conditions

C 1 Atomic Absorption Spectroscopy (AAS)

Preparation of standard solutions: 2.542 g of dried NaCl was dissolved in water and diluted to 1 litre to give 1000 ug/mL Na

Recommended of instrument parameters for atomic absorption experiments

Table C1-1 Working condition (FIXED)

Lamp current	5 mA
Fuel	acetylene
Support	air
Flame stoichiometry	oxidizing

Table C1-2 Working condition (VARIABLE)

Wavelength nm	Slit width nm	Optimum working range ug/mL
589	0.5	0.002-1.0
589.6	1.0	0.01-2.0
330.2 330.3	0.5	2-400

Table C1-3 Flame emission

Wavelength	589.0 nm
Slit width	0.1 nm
Fuel	acetylene
Support	air

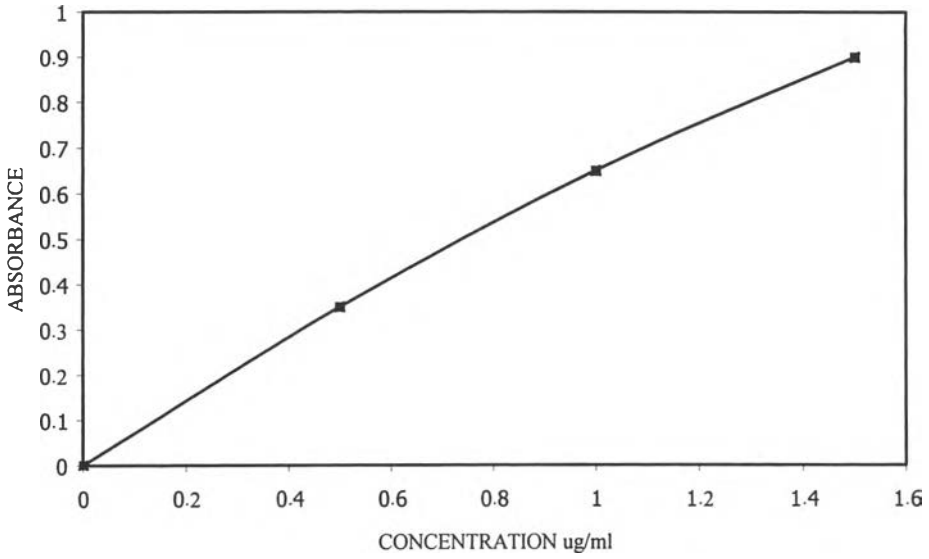

Figure C1-1 Calibration curve of sodium content

C 2 X-ray Diffraction (XRD)

JCPDS File name : Inorganic
Card No. : 341084
C. formular : ZrO_2
C. or mineral name : Zr O
Reli. Signs : I
Target. : Cu Wave length : 1.54050 Ang

Table C 2-1 Standard peak of Zirconia from X-ray Diffraction (XRD)

Peak No.	d - value	Intensity	2 theta
1	2.925	100	30
2	2.623	75	34
3	2.509	50	36
4	1.791	100	50
6	1.704	25	54
7	1.641	25	56
8	1.565	50	59
9	1.518	75	61
10	1.462	50	64
11	1.409	25	66

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