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7	Japan; ² Department of Chemistry, Graduate School of Science, Osaka University, 1-1, Machikaneyama,							
8	Toyonaka, Osaka 560-0043, Japan							
9	* Corresponding author(s): nishihama@kitakyu-u.ac.jp (S	. Nishihama); sxt@che	em.sci.osaka u.ac.jp (S. Tsukahara)				
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- 40 reagents were supplied by Wako Puremical Industries, as analytical-grade reagents.
- 2.2 Preparation of SIF and SIR 41
- 42 The SIF containing PC-88A was prepared by the following method. The kapok fibers were firstly cut 43 into ca. 0.5×0.5 cm pieces, and then were washed with methanol. After drying, the cut fibers were contacted 44 with ethanol solution of PC-88A (0.3 mol/L - 1.0 mol/L as monomeric species) at a ratio of 50 mL/g for more
- 45 than 12 h at 298 K. Ethanol was then removed by evaporation, and the fiber was washed with excess amount also prepared by the same manner as the SIF.
- 46 of D.I. water and dried for No space between sections!
 - 47 The impregnated amount of termined by the difference of weight of fiber 48 or resin before and after impromation.

49 2.3 Adsorption of Eu(III)

50 The aqueous solutions were prepared by dissolving Eu(NO₃)₃·6H₂O in D.I. water. The concentration 51 of Eu(III), in the case for time course variation and pH dependency, was set to ca. 1.0 mmol/L, while the 52 concentration was varied from 1.0×10^{-6} mol/L to 22 mmol/L for the adsorption isotherm experiments. The 53 pH value was adjusted by adding appropriate concentrations of HNO₃ or NaOH solution. A 0.02 g of SIF or 54 a 0.03 g of SIR was added to 10 mL of Eu(III) aqueous solution to be shaken at 298 K (25 °C) for more than 55 4 h in the case of SIF and for more than 12 h in the case of SIR, which are enough to be reached to equilibrium After filtration the equilibrium pH was measured by a pH meter (Horiba F-56 from preliminer Use eq. and eqs. to express equation(s). 57 23). The con actively coupled plasma atomic emission 58 spectrophotometer AES; Shimadzu ICPS-7000). The amount of Eu(III) adsorbed, q, is defined by eq. 59 (1).

$$([\mathrm{Eu}]_0 - [\mathrm{Eu}]_{\mathrm{e}}) \cdot L$$

61 where $[Eu]_0$ and $[Eu]_e$ are initial and equilibrium concentrations of Eu(III) in the aqueous phase, L is volume of aqueous solution, and w is weight of adsorbent including PC-88A and support. The leakage of PC-88A 62 63 during adsorption was also determined by measuring phosphorus concentration in the aqueous phase after 64 adsorption.

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3. Results and Discussion

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(1)

67 **3.1 Preparation of SIF**

68 Impregnation abilities of PC-88A into kapok fibers and conventional resins are investigated by 69 changing concentrations of PC-88A at the impregnation procedure. Table 1 shows the impregnation amount 70 of PC-88A in each support. In all support systems, impregnation amount is almost saturated with 0.3 mol/L 71 of PC-88A, and the impregnation amount is hardly changed by increasing in PC-88A concentration. 72 Impregnation is therefore conducted with 0.3 mol/L of PC-88A hereafter. Kapok fibers have much higher 73 impregnation abilities than both of conventional resins. Among two kapok fibers, M-4050 possesses slightly 74 higher impregnation ability than KT-65. This may be due to the content of kapok, as shown in Table 1. 75

Always full spelling!

	1 0	-	- 1 2	
[PC-88A]	Impregnation amount (mmol/support-g)			
(mol/L)	Sample A	Sample B	Sample C	Sample D
0.1	2.00	2.10	1.90	1.80
0.2	2.00	2.10	1.90	1.80

Table 1. Impregnation amount of PC-88A on polymer resins.

Always full spelling!

70

97

98

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the extractant.

77 **3.2** Ads ption behavior of Eu(III)

Figure 1 shows time course variations of adsorption of Eu(III) with SIFs. The adsorption reaches equilibrium within 3 h in both systems. Figure 2 shows the effect of pH on adsorption amount of Eu(III), together with leakage of PC-88A. In all systems, the adsorption increases with increase in pH, as same as in

81 the solvent extraction system. Comparing the adsorption 82 behavior with SIF and SIR, much higher adsorption 83 amount is obviously obtained in SIF systems. Comparing 84 the support fiber of SIF, KT-65 and M-4050, the 85 adsorption amount of Eu(III) with SIF prepared by M-4050 is lower than that by KT-65 at higher pH region, in 86 87 spite of higher impregnation amount of PC-88A by M-88 4050. The leakage of PC-88A from SIF by M-4050 is 89

89 much higher than that from SIF by KT-65 as well as the90 conventional SIRs. The smaller adsorption ability of SIF

91 by M-4050 is caused by the leakage of PC-88A from SIF.

92 The KT-65 is therefore concluded to

93 for PC-88A than M-4050 and also cor

94 resins. The maximum adsorption amount with SIF is 3.6

times higher than the conventional SIR. The kapok fiberis therefore expected as a new support for impregnating



Figure 1. Effect of pH on the distribution ratio of Eu(III) and leakage of PC-88A.

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4. Conclusion

100 The abbreviation of Solvent Extraction Research and Development, Japan (SERDJ) is Solvent Extr. Res. Dev., Jpn. The solvent impregnated kapok fiber is prepared, using PC-88A as an extractant, and the 101 102 adsorption property of Eu(III) with the SIF is investigated. KT-65 possesses higher adsorption ability for Eu(III) than M-4050 due to less leakage of the extractant from SIF during the adsorption. The KT-65 has also 103 104 ca. 35 % higher impregnation ability of PC-88A than conventional polymer resins, HP20 and HP2MG, and 105 the amximum adsorption amount of 0.685 mmol/g of Eu(III), which is 3.6 times higher than HP20, is obtained. 106] 1 blank line 107 Acknowledgement 108 This study was supported by a Grant-in-Aid for Scientific Research (No. xxxx) of the Ministry of

109 Education, Science, Sports and Culture of Japan.

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