**Supplementary material**

**Efficient preparation of enantiopure D-phenylalanine through asymmetric resolution using immobilized phenylalanine ammonia-lyase from *Rhodotorula glutini* JN-1 in a recirculating packed-bed reactor**

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**Supporting information S1**

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Where, Mpal, in is the total protein content added to the mixture (mg); Mpal, out is the protein content

of the washing solution and supernatant after immobilization (mg); Msupport is the weight of the support (g); Lphe, in is the concentration of L-phenylalanine in the inlet solution (mM); Lphe, out is the oncentration of L-phenylalanine in the outlet solution (mM); Dphe, out is the concentration of D-phenylalanine in the outlet solution (mM); h is the time when the *ee*D exceeds 99 %; F is the flow rate (mL/min) of the substrate, V is the reactor volume (mL).

**Supplementary figure legends**

**Figure S1. Schematic illustration of the covalent methods of immobilized *Rg*PAL on an MCM-41 support.**

The amino group was grafted onto MCM-41 to generate MCM-41-NH2, and then the bifunctional glutardealdehyde (GA) was used to cross link the enzyme and MCM-41-NH2 to generate MCM-41-NH-GA-*Rg*PAL.

**Figure S2. Schematic diagram of the resolution of DL-phenylalanine using immobilized *Rg*PAL in a RPBR.**

The immobilized *Rg*PAL was packed into a RPBR. Substrates were fed from the bottom of the column using a controlled peristaltic pump. The solution was recirculated until the reaction nearly reached completion. The products were collected in a separate tank. Samples of the input and output were collected and analyzed by HPLC.