

## Biotechnology Industry

### Production and Application of Recombinant Microbial Lipases

Lipase from *Candida rugosa* (CRL) has been widely used in biotechnological and industrial applications. We have identified several isozymes of extracellular *C. rugosa* lipases and demonstrated that these lipase isozymes are different in catalytic efficiency and specificity. Five CRL genes have been isolated, functionally expressed. The five recombinant lipases with different catalytic efficiency can be used for various applications.

Fields of application:

1. The broad specificity of hydrolytic and synthetic reactions can be useful for

chemistry, pharmaceuticals, medicine, detergents, cosmetics and food applications.

2. The optical resolution of organic compounds.

3. The bioconversion of fat.

Advantages when compared to the existing technologies:

1. For particular application, the individual recombinant CRL isoenzyme takes the

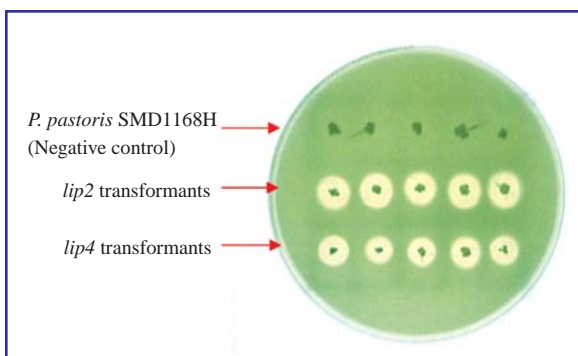
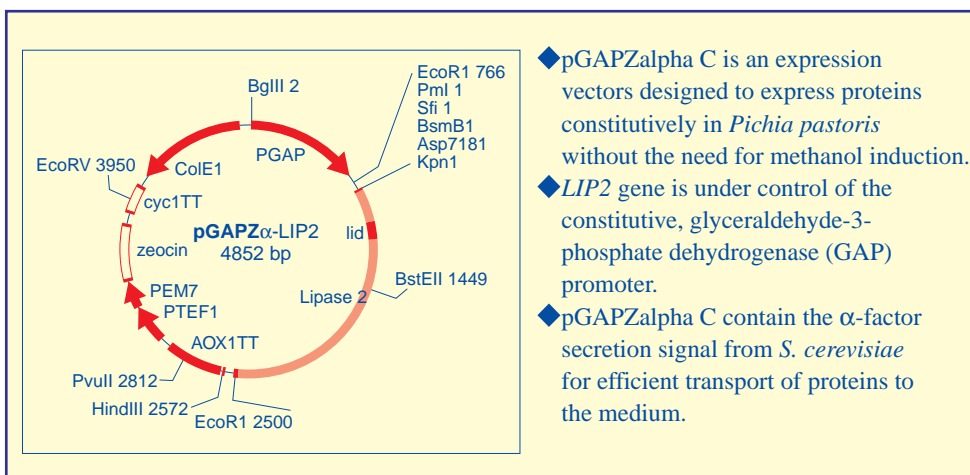


Plate assay for recombinant CRLs



Construction of expression cassette for CRLs

◆ pGAPZalpha C is an expression vectors designed to express proteins constitutively in *Pichia pastoris* without the need for methanol induction.

◆ LIP2 gene is under control of the constitutive, glyceraldehyde-3-phosphate dehydrogenase (GAP) promoter.

◆ pGAPZalpha C contain the  $\alpha$ -factor secretion signal from *S. cerevisiae* for efficient transport of proteins to the medium.

## In This Issue

- Production and Application of Recombinant Microbial Lipases
- Infrared Heating and Drying Application
- Front-Opening Unified Pod Auto-Loading Structure
- Resin Composition with Excellent Dielectric Property
- The Methodology of Automatically Correcting Optical Character Recognition Personal Data

advantages of high efficiency and reproducibility than crude CRL from commercial suppliers.

2. There is only one production of recombinant CRL isoenzyme (CRL 1) that has been patented (Patent WO9914338A1). Five more CRL isoenzymes with different properties, which we produce respectively, can be used for more versatile applications.

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**Chemical Product Manufacturing; Food Manufacturing; Electronics Industry**

**Infrared Heating and Drying Application**

Infrared is a type of electromagnetic wave, which, based on wave length, can be categorized into near-infrared (0.78-2µm), medium-infrared (2-4.6µm) and far-infrared (4.6-1000µm). Given that the vibration and rotation frequency of atom bonding in the molecules of a certain substance falls within the infrared frequency range, this substance can be heated by infrared radiation.

Infrared heating has the advantage of (1) capability of penetration and heat-up uniformly, (2) direct energy transfer with high efficiency, (3) zone heating capability as well as saving energy, and (4) clean heating process without pollution. Therefore, it can achieve the significant effect of shortening manufacturing time, reducing the space for equipment and enhancing production and quality.

Due to the advantages described above, IR Heating is widely applied in various areas, illustrated

as follows:

Industry	Effect	High quality	Short timing	Enhancing production	Saving energy
Food, Agriculture	⊗	○	○	○	○
Metal, Wooden furniture	⊗	⊗	○	○	⊗
Resin, Rubber, Leather	⊗	⊗	○	○	○
Wood Fiber, Paper	⊗	⊗	○	○	○
Pottery, Glass	⊗	⊗	○	○	⊗
Electrical Electronic	⊗	⊗	○	○	○
Pharmaceutical, Chemistry	⊗	○	⊗	○	○
Green House, Cultivation, Breeding	○	○	-	○	⊗

⊗ Very significant ○ significant - insignificant

In light of the significant advantage by Infrared Heating (IRH), our institute has developed many IRH systems and related technology.

The techniques available now include:

- (1) Emissivity measurement technology.
- (2) Manufacture of infrared powders and paints.
- (3) Manufacture of metal-based infrared heaters.
- (4) Optimal IRH system designing technology.
- (5) Development of various types of IRH equipment.

For many techniques developed by our institute, the ROC, US and Mainland China patent has been granted. The inventors are seeking possible cooperation with domestic or overseas machine equipment manufacturers. (ROC Patent No. 443091, 390431, 339539, 258070, 229815, 216652, 212168, US Patent No.5219802)

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Infrared paper tube drying oven



Infrared tea baking machine



Infrared automobile safety glass baking oven

## Integrated Circuits Industry

### Front-Opening Unified Pod Auto-Loading Structure

In the fabrication of wafers, wafers are put in a unified pod, and the purity of the small inside space of the unified pod is well controlled. Because the purity of the small inside space of the unified pod is well controlled, the purity of the cleaning room is less critical. This measure saves much wafer manufacturing equipment cleaning cost. However, external dust or human body dust may be carried in the manufacturing equipment when opening the cover of the unified pod, causing a contamination to wafers.

The present invention relates to a FOUP (front-opening unified pod) auto-loading structure (Fig. 1, 2) and, more particularly, to such FOUP auto-loading structure, which is suitable for use in the loading-in interface in a wafer manufacturing process to automatically close/open the cover of a FOUP.

The invention includes mainly a machine base, a carriage, a sliding control mechanism, a clamp mechanism, a horizontal shifting mechanism, and a lifting mechanism. The FOUP (front-opening unified pod) is put on the carriage and held down by a clamp plate of the clamp mechanism, and then moved and

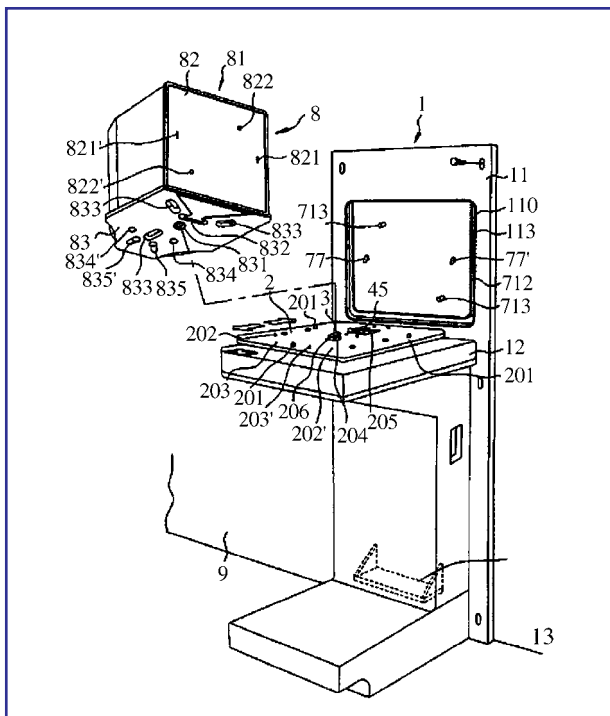


Fig. 1 Front-opening unified pod auto-loading structure (diagram)



Fig. 2 Front-opening unified pod auto-loading structure (photo)

contacted to a gate on an access at a backboard of the machine base, and then a cover of the FOUP is opened by a cover close/open control mechanism at the back of the gate, and then the cover is carried backwardly away from the FOUP by the horizontal shifting mechanism and then lowered with the lifting mechanism. The cover is closed on the FOUP when reversing the procedure. The automatic FOUP cover closing/opening operation prevents wafers from contamination.

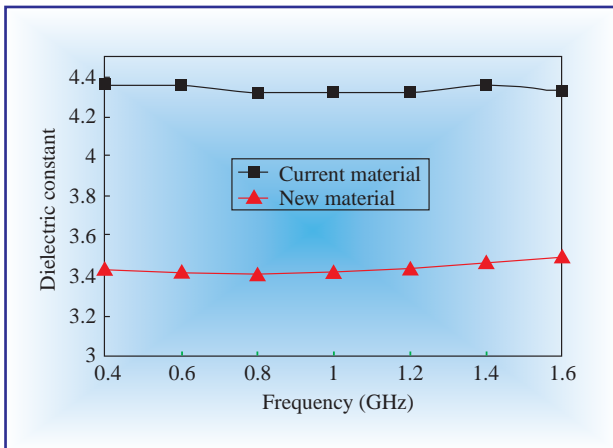
For further information, write to or call Kuan-Chou Chen, Ping-Yu Hu, Kuei-Jung Chen, Tzong-Ming Wu, Wu-Lang Lin, Wen-Yo Lee, Mechanical Industry Research Laboratories, Industrial Technology Research Institute, Hsinchu, Taiwan, ROC. Tel: 886-3-5916489, E-mail: 770443@itri.org.tw.

## Electronics Industry

### Resin Composition with Excellent Dielectric Property

New generation electronic products tend to small, light, thin and multifunction. They need to deal with a lot of data and handle information as fast as possible. The used frequency and bandwidth are higher than current electronic products so new generation electronic materials are limited strictly.

The characteristics of new generation materials are low dielectric constant that can shorten signal transmission time and reduce transmission energy



The compare of dielectric constant between new generation electronic material and currently electronic material

loss. The innovation blends thermoplastic resin and thermosetting resin that has low dielectric constant. Thermoplastic resins have excellent electronic property and thermosetting resins have good chemical resistant and weather resistant. Both of excellent properties in thermoplastic resins and thermosetting resins are used to make new generation electronic materials with excellent electronic property and good thermosetting resin properties. The new generation material has excellent electronic property that can manufacture new generation electronic products.

The composition blends low dielectric constant material with currently electronic material to reduce new generation material's dielectric constant. It can not only be used to PCB industry but also be used in RCC substrates industry.

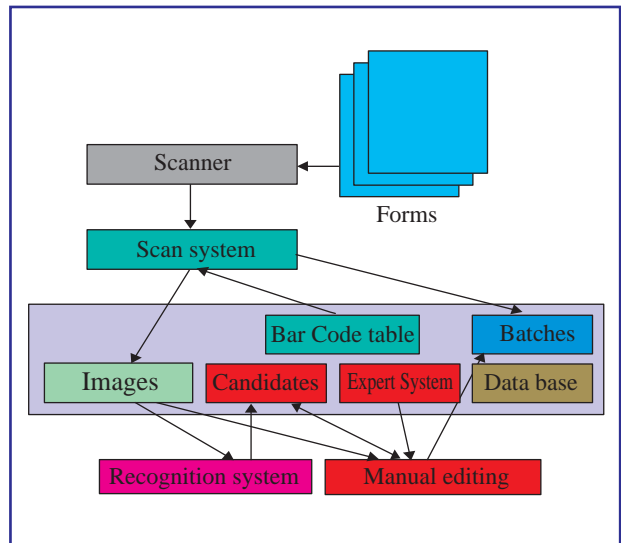
The developers wish to cooperate with qualified domestic or overseas manufacturers. (ROC Patent No.137317)

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## Computer Software Industry

### The Methodology of Automatically Correcting Optical Character Recognition Personal Data

This invention proposes a methodology of automatically correcting optical character recognition



The methodology of automatic correction

personal data of forms. It is a model by means of artificial intelligence concept. We build an expert system according to the relations between the members of a family.

While the user edits the data, this system will analyze the error fields according to the expert system, accumulate the error count and sort them by descending order. Then it will automatically correct the error fields by means of this two data, one is the characteristics of the fields, the other is the top 5 candidates from the results of optical character recognition. We will check the error fields and correct them until the error number equals or near to zero. It means that we finish the correction of error fields.

This invention proposes the following techniques:

1. It is an efficient method for correction.
2. We propose an easily understandable screen layout editing format.
3. We use an editing format by means of the data of one person.
4. We build an expert system for checking error number of fields.
5. We propose a structure of automatic correction for easily expanding fields.
6. We propose the method for concurrently checking error number of fields in multiple forms.

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