



Invented in the early 1950's for the purification of semiconductors, ZONE REFINING is the method of choice for ultra-purification of organic chemicals. This technique:

- **Requires no solvent or column**
- **Sample is 100% recovered**
- **Operates automatically**
- **Sample sizes from 250 mg to 4 grams are easily purified**
- **Requires only minutes to set up.**

Chemicals that melt without decomposition and are at least partially crystalline are candidates for zone refining.

Applications include:

- **Preparation of standards**
- **Isolation of Impurities**
- **Purification of laser dyes, scintillation materials, organic semiconductors**
- **Study of ultra-pure chemicals**

## MiniZone Refiner Specifications

Number of Zones	Four Hot; Four Cold
Sample Tubing Size	Large: 165 mm long X 6.1 mm OD, Medium: 165 mm long X 4.4 mm OD
Heating	125 watts. Platinum RTD temperature sensor with proportional control Temperature set to nearest 1 °C, Maximum Temperature: 250 °C
Tube Transport	Stepper Motor Control, Continuously Variable from 1 to 90 cm/hour.
Electrical	110-120 Volts or 220-240 volts @ 50-60 Hz, 400 Watts. Voltage set at time of manufacture
Physical	36.5 cm (14.375") long X 20.3 cm (8") high X 20.3 cm (8") wide 5.45 Kg (12 lbs)

## Ordering Information

MZ10	MiniZone Refiner. Includes package of 12 large and 12 medium Teflon® sample tubes, power cord, Instruction Manual, Zone Refiner Simulator Software
MZLARGE	Package of 20 Teflon Sample Tubes, 6.1 mm OD X 5.1 mm ID, 2.04 ml/10 cm
MZMEDIUM	Package of 25 Teflon Sample Tubes, 4.4 mm OD X 3.4 mm ID, 0.91 ml/10 cm

株式会社和貴研究所 ナノサイエンス事業部

カブシキガイシャ ワキケンキュウジョ

TEL:047-309-8312 FAX:047-309-8313

〒270-0021

千葉県松戸市小金原7-10-25

URL : <http://waki-bg.jp/nanotop/>

In Zone Refining, a short molten zone travels slowly through an elongated sample of a crystalline material. A molten zone traversing a solid sample has two

liquid-solid interfaces; a melting interface and a freezing interface. At the melting interface the composition



sample of a crystalline material. A molten zone traversing a solid sample has two liquid-solid interfaces; a melting interface and a freezing interface. At the melting interface the composition does not change but at the freezing interface, the impurities favor the liquid phase because the crystal structure tends to exclude molecules that do not readily fit into the crystal lattice. Passing the molten zone(s) through the sample many times concentrates the impurities at one end leaving the opposite end highly purified.



The photo shows a sample during the refinement process in the MiniZone refiner. The sample is contained in one (or two) disposable, thin-walled Teflon® sample tubes. These tubes are filled with the sample and clamped on each end in the tube transport mechanism. (The metal blocks at the top and bottom of the photo.) The transport mechanism slowly moves the tubes downward, passing them through the four heating and four cooling zones of the temperature regulated metal blocks. After the tubes move downward the distance of one hot

zone and one cold zone (two centimeters), the transport mechanism is reversed and the tubes are quickly moved upward to the original position. The net result of this motion is that the molten and crystalline zones migrate slowly and continuously upward with respect to the tubing.

With a typical zone rate of 2 cm/hr and with four active zones, each portion of the sample is subjected to one purifying phase transitions per hour. Usually within 18 hours of automatic operation (18 recrystallizations), the sample is purified. After the sample tube is cooled, it is removed from the MiniZone. The refined sample is easily recovered by cutting the tube into sections. The major portion of the impurities are concentrated at one end of the tube.

For more information on zone refining, please visit our web site at [www.resolutionsys.com](http://www.resolutionsys.com).

## Free Zone Refiner Simulator Software

Explains the theory of zone refining and displays how the sample is purified. E-mail [info@resolutionsys.com](mailto:info@resolutionsys.com) to request your free copy.

