



Figure 11.15 Zone melting crystallizer.

of the substance crystallizes on the drum and grows until the crystals leave the bath of melt. Products can be harvested by using a scraper and further purified by washing or sweating.

11.4.2.3 Zone Melting Crystallization

Zone melting^{2,42,43} is a multistage melt crystallization technique based on a repeated formation of solid layers in a continuous mode. As shown in Figure 11.15, the oven is moved through the glass tube filled with sample mixtures. The substance in the part of the tube heated by the oven is in the molten state and could be mixed effectively by the intermittent rotation of the tube. Other parts of the tube are cooled down until the substances recrystallize. As the molten substance leaves the oven, purer crystal layer forms and the impurities are forced to move upwards. By repeating the process, purity of the samples gets higher and higher.

In real continuous zone melting crystallization processes, the zone melting technique is usually employed together with belt or drum crystallizers, shown in Figure 11.16 and 11.17, respectively. With multiple zone melting heaters, crystal layers formed from the belt or drum crystallizer could be further purified before they can be harvested using the scrapers. However, as for materials with high vapor pressures at their melting points, rapid loss of material from the melt could happen. Besides, the efficiency of the zone melting method strongly depends on the mass transfer between the liquid at the freezing interface and the liquid in the