

Sample preparation for modern trace analysis : PMD : pressurized microwave decomposition : fast, safe, powerful / Anton Paar K.G.

Contributors

Anton Paar (Firm)
Paar Scientific (Firm)

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Wellcome Collection
183 Euston Road
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T +44 (0)20 7611 8722
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Sample preparation for modern trace analysis:

PMD

Pressurized Microwave Decomposition



- **Fast**
- **Safe**
- **Powerful**

AP **PAAR**

Pressurized Microwave Decomposition **PMD**

The closed vessel decomposition at high operating temperatures and pressures using quartz glass vessels, is increasingly approved to be the optimal method for sample preparation in elemental trace analysis.

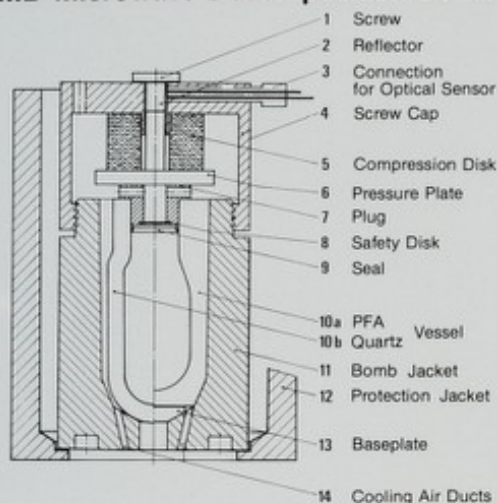
From years of experience in manufacturing highly sophisticated sample preparation equipment, in cooperation with the Technical University Graz, we are proud to offer the powerful

PMD Pressurized Microwave Decomposition System with Pressure Controlled Heating.

It is designed for fast, safe and reliable decomposition of various samples in closed quartz or PFA vessels.

- The special design, high-quality materials and **easy handling** reduce systematic errors to a minimum.
- Decomposition times of just a few minutes and quick cooling of the vessels inside the oven by use of the **ECU Exhaust and Cooling Unit**.
- Pressure-resistant quartz vessels allow decomposition temperatures of approx. **300 °C**.

PMD Microwave Decomposition Bomb



Operation

1. When microwaves are acting on acid and sample inside the decomposition vessel, the acid is heated and a reaction pressure will be built up within the vessel causing the plug (7) to be pressed against the compression disk (5).
2. Continuous pressure increase moves the plug (7) upwards causing the pressure plate (6) and the screw (1) with reflector (2) to move upwards also.
3. As soon as a reaction pressure of approx. 80 bar is reached, the metallic reflector leaves the field of the optical sensor (3), which detects this change of the optical signal and switches off the microwave energy.
4. The temperature and consequently the pressure falls and the plug moves downward until the optical sensor is able to detect the reflector again.
5. At this point microwave energy will be actuated again and the control action is repeated as stated above. Upon decomposition, the vessel is forced air cooled to ambient temperature in a few minutes.

The Outstanding Features of the PMD System

- FAST** — microwave heating reduces decomposition times to a few minutes. Minimum cooling time by use of powerful exhaust and cooling unit.
- SAFE** — multiple safety precautions — pressure cutoff, safety disk, plexiglass protective shield — guarantee the operator's safety in case of spontaneous reactions.
- POWERFUL** — decomposition in closed quartz vessels at temperatures of approx. 300 °C and pressures up to 80 bar.
- EASY** — handling successfully proved.
- MODULAR** — low-priced basic equipment can be extended subject to your demands.

Applications

Sample	Weight (g)	Reagents	Time (min)	Power Setup
Wheat flour	0.22	2 ml HNO ₃	10	6
Milk Powder (BCR 150)	0.25	2 ml HNO ₃ 0.2 ml HCl	10	6
Spinach (NBS 1570)	0.3	2 ml HNO ₃ 0.5 ml HCl	5	6
Bovine Liver (NBS 1577a)	0.3	2 ml HNO ₃ 0.5 ml HCl	10	8
Aquatic Plant	0.2	2 ml HNO ₃ 0.5 ml HCl	5	6
Pine Needles (NBS 1575)	0.3	2 ml HNO ₃	10	6
Sewage Sludge	0.2	2 ml HNO ₃	10	6
Activated Carbon	0.1	2 ml HNO ₃	10	8
Nitrile butadiene rubber with high soot content	0.1	2 ml HNO ₃ 0.2 ml HCl	10	10
Polyethylene, PVC	0.1	2 ml HNO ₃	20	10
Epoxy Resin	0.25	2 ml HNO ₃ 0.5 ml HCl	6	8
Lubrication Oil	0.1	2 ml HNO ₃ 0.2 ml HCl	15	10
Whole blood, serum, urine	2	4 ml HNO ₃	10	6
Ferric Oxide	0.2	3 ml HNO ₃ 3 ml HCl	10	8
Zirconium oxide, hafnium oxide	0.1	3 ml HF 3 ml H ₂ O	15	10
Pigment with mica	0.16	1.5 ml H ₂ O 1.5 ml HF 1.5 ml HNO ₃	15	10

Basic Equipment

Cat.No.	Item	Cat.No.	Item
66975	PMD Microwave oven	66786	Protection jacket
67312	ECU Exhaust and cooling unit	66974	Tool plate
66976	Decomposition bomb	66769	Seal
66764	Quartz vessel		(5 pcs. recommended)

Specifications subject to change without notice.

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Anton Paar K. G., A - 8054 GRAZ, Postfach 58
Kärntner Strasse 322, AUSTRIA - EUROPE
Phone (0316) 28 26 12 - 0, Teletex 33 16 246, Fax (0316) 28 50 69

Instruments for — density/concentration — preparation for electron microscopy
— rheology — fibre testing
— X-ray structure analysis — medical equipment
— preparation for trace analysis — astronomy ... and others

PAAR SCIENTIFIC LTD.

594 Kingston Road
Raynes Park
London SW20 8DN
Tel: 081 - 540 8553
Telex: 938292 PAAR G Fax: 081 - 543 8727