

## Universal Thermal Cracker for Surface Science

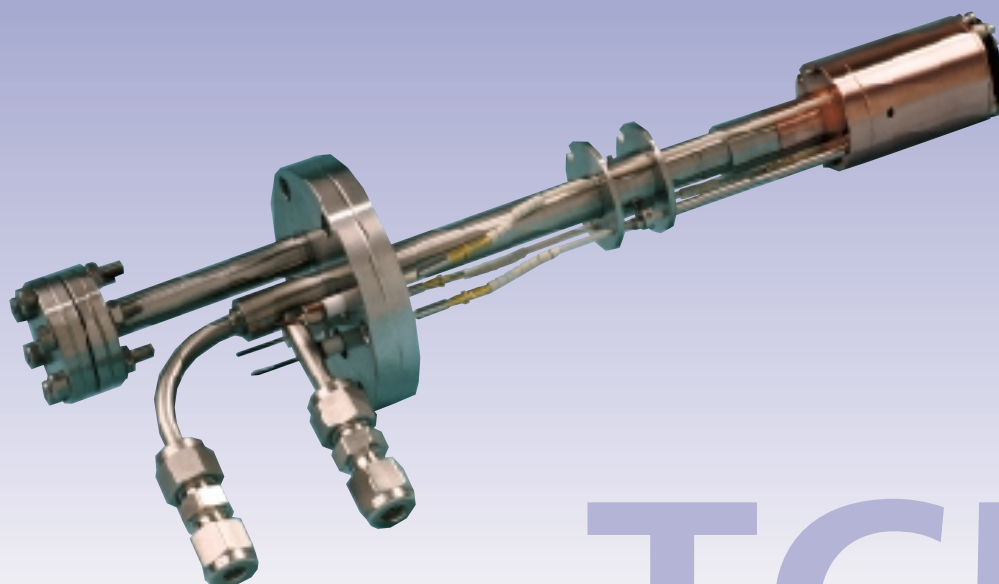
H<sub>2</sub>, O<sub>2</sub>, hydrides, halogens, HCs, NH<sub>3</sub>

### The TC50

Currently available thermal crackers employ a very hot (~2500°C) tungsten filament at high power (~400W), thus imposing an undesirable heat load on UHV systems. Also, this type of cracker is not very gas-efficient and is of limited application (principally for H<sub>2</sub>) since tungsten is severely attacked by some gases, such as oxygen. The Oxford Applied Research Universal Thermal Cracker, model TC50, exploits its established reactive gas-resistant e-beam heating technology. It incorporates a fine-bore inert cracker *tube* connected directly to the gas-inlet line, thus confining and minimising gas load, whilst providing a large surface area and long path length for high efficiency cracking at very low flow rates.

The catalytic nature of the cracker tube substantially lowers the otherwise-high temperature and power necessary to achieve substantial (>70%) dissociation, respectively to <1000°C at 60W. Also, in contrast to tungsten filament crackers, it can be used to dissociate O<sub>2</sub>, Cl<sub>2</sub> and other reactive gases and thus constitutes a truly universal thermal cracker.† Direct water-cooling of the cracker body minimises outgassing of the instrument which is also fitted with a back-up (oxygen-resistant) spare filament for prolonged operations.

*† A singular exception is N<sub>2</sub> – its bond energy is too high.*



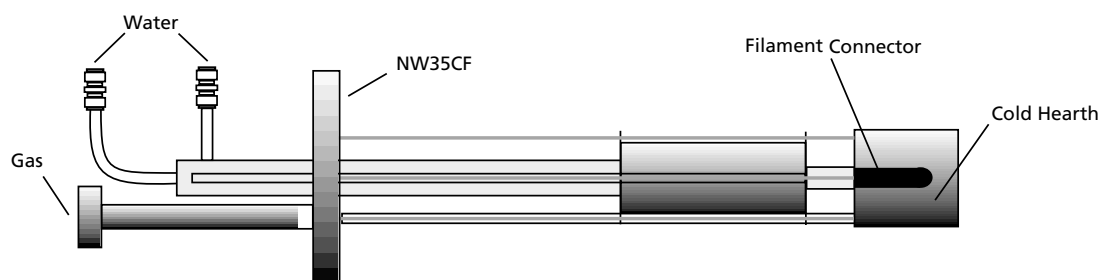
# TC50

## Applications

- 'Soft' substrate cleaning
- Oxides, Nitrides, Oxynitrides
- Surfactants
- Zero-damage hydrogen cleaning
- Etching with H, Cl, Br

## Features

- High dissociation efficiency
- Ultra-clean operation
- Very low power (<60W)
- Dual/Back-up filament
- Low Maintenance



TC50 Thermal Cracker (schematic and not to scale)

## Specification – model TC50<sup>†</sup>

|                           |  |
|---------------------------|--|
| <b>Mounting</b>           | NW35CF                                   |
| <b>In-vacuum diameter</b> | 34mm                                     |
| <b>In-vacuum length</b>   | 200mm (standard)                         |
| <b>Cracker temp.</b>      | ≤1000°C                                  |
| <b>Max. Power</b>         | 60W                                      |
| <b>Services</b>           | Water (0.5litres/min. <20°C)             |
| <b>Power supply</b>       | Single phase 110/220V AC                 |
| <b>Gas flow rate</b>      | <0.5sccm                                 |
| <b>Filaments</b>          | Two ThO <sub>2</sub> -coated (one spare) |

<sup>†</sup> A Technical Note on the TC50 and its applications is available on request.

## Options

- Remote computer-operated gas doser valve with RS232 interface
- Shutter – manual or remote

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