

## **TA Instruments - Q600 SDT**

**SIMULTANEOUS THERMAL ANALYSIS** (Thermogravimetry (TG) – Differential Thermal Analysis (DTA) or Differential Scanning Calorimetry (DSC)) allows qualifying or quantifying the heat effects occurring during a mass variation or any transition not related to a mass change. This includes phase transformations, relaxation processes, chemical reactions etc. and the possibility of qualitative and quantitative evaluation of the processes involved in the aforementioned phenomena.



### **Teaching activities:**

*Bachelors* – Materials technology, The physics and technology of oxide materials, The physics and technology of magnetic materials

*Masters* – Research internship, Experimental Methods III, Physics of metals and alloys.

*PhD* – Research for PhD thesis in the areas of solid state physics and materials science

### **Research areas:**

Condensed matter physics, permanent magnets, polymer physics, chemistry etc.

For example, the device provided essential data for the investigation of nanocomposite materials for permanent magnet applications (exchange couple rare-earth (RE) – Fe nanocomposites), rare-earth lean permanent magnets ( $Mn_{54-x}M_xAl_{46}$  M = Ni, Ti), Heusler type alloys for spintronics applications ( $X_2YZ$  X=Mn Y=V Z=Al) etc.

### **Technical details:**

- Temperature range ambient to 1500°C.
- Heating rate from 0.1 to 100°C/min from ambient to 1000°C and 0.1 to 25°C/min from ambient to 1500°C;
- Capable of measurement under high purity gas atmosphere: Ar 5.0 or N2 5.0.
- Reactive gases can be introduced inside the furnace without affecting the electronics or balance; balance sensitivity 0.1µg; The dual optical balance allows the measurement of two thermogravimetric measurements, simultaneously.
- Additional details [here](#).

### **Access to the device:**

Access to the device is permitted under the supervision of the trained personnel at Ioan Ursu Institute of Physics, after making an appointment by [e-mailing](#) the person responsible for the device, in which the nature of the sample and the desired measurement procedure is detailed.

**Person Responsible for the Laboratory:** Prof. Dr. Pop Viorel

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## **TA Instruments - Q600 SDT**

ANALIZA TERMICA SIMULTANA ( Termogravimetrie (TG) – Analiza Termica Diferentiala (ATD) sau TG – Calorimetrie cu Scanare Diferentiala (CSD) ) permite efectuare de determinari calitative si cantitative ale efectelor termice care au loc in timpul variatiilor de masa sau a oricaror tranzitii independente de variatia masei. Acestea includ transformari de faza, procese de relaxare, reactii chimice etc. si posibilitatea efectuării unor evaluari atat calitative cat si cantitative ale proceselor implicate in aceste fenomene.



### **Activități didactice:**

*Nivel licenta* – Tehnologia materialelor, Fizica și tehnologia materialelor oxidice, Fizica si tehnologia materialelor magnetice

*Nivel masterat* – Practica de cercetare, Metode experimentale III, Fizica metalelor si aliajelor.

*Nivel doctorat* – cercetari in vederea elaborarii lucrarii de doctorat in domeniul fizicii corpului solid si al stiintei materialelor

### **Domenii cercetare:**

Fizica stării condensate, magneți permanenți, fizica polimerilor, chimie etc.

Spre exemplu, aparatul a permis efectuarea unor masuratori esentiale pentru investigarea materialelor nanocompozite cu aplicatii in domeniul magnetilor permanenti (de tip spring magnet), aliajelor magnetice dure fara contrinut de pamant rar ( $Mn_{54-x}M_xAl_{46}$   $M = Ni, Ti$ ), aliaje te tip Heusler cu aplicatii in spintronica ( $X_2YZ$   $X=Mn$   $Y=V$   $Z=Al$ ) etc.

### **Detalii tehnice:**

- Plaja temperatura de la ambient la 1500°C.
- Rampa de incalzire 0.1 la 100°C/min pentru ambient la 1000°C si 0.1 la 25°C/min de la ambient la 1500°C;
- Posibilitate de masura sub atmosfera controlata : Ar 5.0 sau N2 5.0.
- Posibilitatea de introducere a unor gaze reactive in cuptor fără a afecta electronica si balanta; Sensibilitate balanta 0.1µg; Balanta orizontala optica duala, permite realizarea a doua determinari termogravimetrice simultan;
- Detalii suplimentare [aici](#).

### **Acces aparat:**

Accesul la aparat este permis sub supraveghera personalului de specialitate în urma programării prin trimiterea unui [e-mail](#) responsabilului de aparat, în care se detaliaza natura esantioanelor și detalii despre masuratori.

**Responsabil Laborator:** Prof. Dr. Pop Viorel

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