

**A N A L E L E**  
**U N I V E R S I T Ă Ţ I I**  
**“O V I D I U S”**  
**C O N S T A N Ţ A**

Seria:  
**CHIMIE**

**OVIDIUS UNIVERSITY ANNALS OF CHEMISTRY**

**VOL.XXV**

**YEAR XXV - 2014, Number 2**

**Indexed in Chemical Abstracts starting with 2008**  
**CODEN AUOCCG**

**Indexed in Index Copernicus starting with 2009**

**Free online access to full papers starting with 2009:**  
**<http://www.univ-ovidius.ro/anale-chimie>**



**DE GRUYTER**  
OPEN

**Published in open access system by Versita**  
**on De Gruyter platform starting with 2012:**  
**<http://www.degruyter.com/view/j/auoc>**

**ISSN – 1223 – 7221**

## ANALELE UNIVERSITĂȚII "OVIDIUS" CONSTANȚA Seria CHIMIE "OVIDIUS" UNIVERSITY ANNALS OF CHEMISTRY

### AIMS AND SCOPE

"Ovidius University Annals of Chemistry" is a national journal that appears in two issues per year and publishes reviewed original papers in all branches of fundamental and applied chemistry: inorganic, organic, analytical, food, biochemistry, physical chemistry, petroleum technology, chemical process engineering, environmental protection technologies, education in chemistry and environment protection.

### EDITOR IN CHIEF

**Elisabeta CHIRILĂ**

Mail address: "Ovidius" University, Faculty of Applied Sciences and Engineering, Department of Chemistry and Chemical Engineering, 124, Mamaia Blvd., 900527 RO Constanța, Romania; e-mail: echirila@yahoo.com.

### DEPUTY/MANAGING EDITOR

**Gabriela STANCIU**, e-mail: gstanciu@univ-ovidius.ro.

### TECHNICAL EDITORS

**Simona LUPSOR** e-mail: sgutaga@univ-ovidius.ro., **Irina NITA** email: inita@univ-ovidius.ro

### EDITORIAL ADVISORY BOARD

**ANDRUH Marius**, University of Bucharest, RO (Inorganic Chemistry);

**BARBES Lucica**, "Ovidius" University of Constanța, RO (Chemical Technology);

**BARBOSA TORRALBO Jose**, University of Barcelona, ES (Analytical Chemistry)

**BIRGHILA Semaghiul**, "Ovidius" University of Constanța, RO (Analytical and Food Chemistry).

**CHIRILĂ Elisabeta**, "Ovidius" University of Constanța, RO (Analytical and Environmental Chemistry).

**CLARK Andrew**, University of Warwick, Coventry, UK (Organic Chemistry)

**DOBRINAS Simona** "Ovidius" University of Constanța, RO (Analytical and Food Chemistry).

**DRAGHICI Camelia Lucia**, Transilvania University of Brasov, RO (Analytical Chemistry)

**DUMBRAVA Anca**, "Ovidius" University of Constanța, RO (Inorganic Chemistry);

**GIROTTI Stefano**, University of Bologna, IT (Analytical and Environmental Chemistry);

**KONCSAG Claudia Irina**, University of Constanța, RO (Chemical Technology);

**POPESCU Viorica**, "Ovidius" University of Constanța, RO (Physical Chemistry);

**NICOLAU Anca**, Dunarea de Jos University of Galati, RO (Food Safety);

**NITA Irina** "Ovidius" University of Constanța, RO (Physical Chemistry);

**POPOVICI (CARAZEANU) Ionela** "Ovidius" University of Constanța, RO (Inorganic Chemistry);

**ROȘCA Sorin** "Politehnica" University of Bucharest, RO (Organic Chemistry);

**SCHOONMAN Joop**, Delft University of Technology, NL (Inorganic Chemistry);

**STANCIU Gabriela** "Ovidius" University of Constanța, RO (Organic Chemistry);

**UNGUREANU Eleonora Mihaela**, "Politehnica" University of Bucharest, RO (Physical Chemistry);

### ORDERING INFORMATION

The journal may be obtained on exchange basis with similar Romanian or foreign institutions;

**124, Mamaia Blvd, 900527 – RO Constantza, ROMANIA**

© 2014 Ovidius University Press. All rights reserved.

Printed in Romania

This journal and the individual contributions contained in it are protected under copyright by Ovidius University Press and the following terms and conditions apply to their use:

Single photocopies of single articles may be made for personal use as allowed by national copyright laws. Permission of the Publisher and payment of a fee is required for all other photocopying, including multiple or systematic copying. Permissions may be sought directly from Ovidius University Press, 124 Mamaia Blvd, 900527 RO Constanța, Romania