## CONTENTS

<table>
<thead>
<tr>
<th>Title and author(s)</th>
<th>pages</th>
</tr>
</thead>
</table>
| **EDITORIAL 1. Introducing CERAPIE**<br>  
  *G. Tsaparlis*                                                                  | 1-3   |
| **REVIEWERS OF CERAPIE**                                                        | 4     |
| **EDITORIAL 2. Chemistry and science education versus education: A top-down and bottom-up relation**  
  *G. Tsaparlis* | 5-7   |
| **INVITED CONTRIBUTIONS**                                                        |       |
| Teaching of chemistry - Logical or psychological?                                 | 9-15  |
|  
  *A.H. Johnstone*                                                                |       |
| Should chemistry lessons be more intellectually challenging?                      | 17-26 |
|  
  *H.-J. Schmidt*                                                                 |       |
| *(Report from a workshop)*  
  Quality criteria for research papers on science education: How can they be used to improve manuscripts submitted for publication?  
| *(Invited research communication)*  
  Science teachers’ awareness of findings from education research  
  *N. Costa, L. Marques, & R. Kempa*                                              | 31-36 |
| **RESEARCH REPORTS**                                                             |       |
| Teaching lower-secondary chemistry with a piagetian constructivist and an ausbelian meaningful-receptive method: A longitudinal comparison  
  *E. Zarotiadou & G. Tsaparlis*                                                  | 37-50 |
| The teaching of chemistry: Who is the learner?                                   | 51-60 |
|  
  *A. Goodwin*                                                                   |       |
Travaux pratiques en chimie et representation de la reaction chimique par l’équation-bilan dans les registres macroscopique et microscopique: Une etude en classe de seconde (15 – 16 ans)

A. Laugier & A. Dumon

Developing students’ understanding of chemical change: What should we be teaching?

P. Johnson

How to teach the concept of heat of reaction: A study of prospective teachers' initial ideas

O. de Jong

Water in context: Many meanings for the same word

M.A. Pedrosa & M.H. Dias

Computerized molecular modeling - The new technology for enhancing model perception among chemistry educators and learners

N. Barnea & Y. J. Dori

Use of the Internet in the teaching of chemistry in Finnish schools: A case study

I. Varjola

RESEARCH COMMUNICATION

Evaluation of different strategies for the effective use of the World Wide Web in the learning and teaching of university level chemistry

P.C. Yates

THE PRACTICE OF CHEMISTRY EDUCATION: PAPERS

On the use of concept maps at different stages of chemistry teaching

D. Sisovic & S. Bojovic

Gaseous equilibria: Some overlooked aspects

C. Giomini, G. Marrosu, M.E. Cardinali, & A. Paolucci

Ionic equilibrium calculations: A problem solving approach

L. Cardellini

The states-of-matter approach (SOMA) to introductory chemistry

G. Tsapartis
The chemistry graduate destined for employment but with no experience of it. Does it make sense?

R.G. Wallace

THE PRACTICE OF CHEMISTRY EDUCATION: NOTES

The chemistry of photography in full daylight

C.P. Hadjiantoniou-Maroulis & A.J. Maroulis

Updated inorganic and organometallic laboratory course for junior chemistry students

L. Szepes, A. Kotschy, & G. Vass

GUIDELINES FOR SUBMISSIONS