

POGIL 2 Ions

How are ions made from neutral atoms?

You have learned that not all atoms of an element are the same. Variation in the number of neutrons results in different isotopes of the element. In this activity we will explore another variation that can take place—the loss and gain of electrons. The exchange of electrons between atoms is a very common way for chemical change to take place. We will see it many times throughout the year.

1. Use Diagram 1 on the next page to complete the following table.

	Metal or Nonmetal	Number of protons in the atom	Number of protons in the ion	Number of neutrons in the atom	Number of neutrons in the ion	Number of electrons in the atom	Number of electrons in the ion	Charge on the ion
Lithium	metal	3	3	4	4	3	2	1+
Magnesium	<i>Metal</i>	12	12	12	12	12	10	2+
Aluminum	<i>Metalloid</i>	13	13	14	14	13	10	3+
Fluorine	<i>Non metal</i>	9	9	10	10	9	10	1-
Oxygen	nonmetal	8	8	8	8	8	10	2-
Nitrogen	<i>Non metal</i>	7	7	7	7	7	10	3-

2. Based on the table you completed in Question 1, what distinguishes a neutral atom from an ion?

A neutral atom has the same number of protons and electrons (no charge). An ion has a charge (# of protons does not equal # of electrons).

3. Examine the isotope symbols in Diagram 1.

- a. Where is the ion charge located in the isotope symbol?

Top right corner

- b. Is a charge indicated on the neutral atoms? If yes, where is it located?

No

4. Which subatomic particle carries a positive charge?

Protons are positive

5. Which subatomic particle carries a negative charge?

Electrons are negative

6. Propose a mathematical equation to calculate the charge on an ion from the number of protons and electrons in an ion. Confirm that your equation works using two positive ion examples and two negative ion examples from Diagram 1.

The charge of an ion = # of protons - # of electrons

Ions Key Pogil

Keith S Taber



Ions Key Pogil:

Analytical Chemistry Juliette Lantz, Renée Cole, The POGIL Project, 2014-12-31 An essential guide to inquiry approach instrumental analysis Analytical Chemistry offers an essential guide to inquiry approach instrumental analysis collection The book focuses on more in depth coverage and information about an inquiry approach This authoritative guide reviews the basic principles and techniques Topics covered include method of standard the microscopic view of electrochemistry calculating cell potentials the BerriLambert atomic and molecular absorption processes vibrational modes mass spectra interpretation and much more

POGIL Shawn R. Simonson, 2023-07-03 Process Oriented Guided Inquiry Learning POGIL is a pedagogy that is based on research on how people learn and has been shown to lead to better student outcomes in many contexts and in a variety of academic disciplines Beyond facilitating students mastery of a discipline it promotes vital educational outcomes such as communication skills and critical thinking Its active international community of practitioners provides accessible educational development and support for anyone developing related courses Having started as a process developed by a group of chemistry professors focused on helping their students better grasp the concepts of general chemistry The POGIL Project has grown into a dynamic organization of committed instructors who help each other transform classrooms and improve student success develop curricular materials to assist this process conduct research expanding what is known about learning and teaching and provide professional development and collegiality from elementary teachers to college professors As a pedagogy it has been shown to be effective in a variety of content areas and at different educational levels This is an introduction to the process and the community Every POGIL classroom is different and is a reflection of the uniqueness of the particular context the institution department physical space student body and instructor but follows a common structure in which students work cooperatively in self managed small groups of three or four The group work is focused on activities that are carefully designed and scaffolded to enable students to develop important concepts or to deepen and refine their understanding of those ideas or concepts for themselves based entirely on data provided in class not on prior reading of the textbook or other introduction to the topic The learning environment is structured to support the development of process skills such as teamwork effective communication information processing problem solving and critical thinking The instructor's role is to facilitate the development of student concepts and process skills not to simply deliver content to the students The first part of this book introduces the theoretical and philosophical foundations of POGIL pedagogy and summarizes the literature demonstrating its efficacy The second part of the book focusses on implementing POGIL covering the formation and effective management of student teams offering guidance on the selection and writing of POGIL activities as well as on facilitation teaching large classes and assessment The book concludes with examples of implementation in STEM and non STEM disciplines as well as guidance on how to get started Appendices provide additional resources and information about The POGIL Project

Chemical Pedagogy Keith S Taber, 2024-12-20 How should

chemistry be taught in schools colleges and universities Chemical Pedagogy discusses teaching approaches and techniques the reasoning behind them and the evidence for their effectiveness The book surveys a wide range of different pedagogic strategies and tactics that have been recommended to better engage learners and provide more effective chemistry teaching These accounts are supported by an initial introduction to some key ideas and debates about pedagogy the science of teaching Chemical Pedagogy discusses how teaching innovations can be tested to inform research based practice Through this book the author explores the challenges of carrying out valid experimental studies in education and the impediments to generalising study results to diverse teaching and learning contexts As a result the author highlights both the need to read published studies critically and the value of teachers and lecturers testing out recommended innovations in their own classrooms Chemical Pedagogy introduces core principles from research into human cognition and learning to provide a theoretical perspective on how to best teach for engagement and understanding An examination of some of the more contentious debates about pedagogy leads to the advice to seek optimally guided instruction which balances the challenge offered to learners with the level of support provided This provides a framework for discussing a wide range of teaching approaches and techniques that have been recommended to those teaching chemistry across educational levels including both those intended to replace teaching from the front and others that can be built into traditional lecture courses to enhance the learning experience

Making Chemistry Relevant Sharmistha Basu-Dutt, 2010-02-19 Unique new approaches for making chemistry accessible to diverse students Students interest and achievement in academics improve dramatically when they make connections between what they are learning and the potential uses of that knowledge in the workplace and or in the world at large Making Chemistry Relevant presents a unique collection of strategies that have been used successfully in chemistry classrooms to create a learner sensitive environment that enhances academic achievement and social competence of students Rejecting rote memorization the book proposes a cognitive constructivist philosophy that casts the teacher as a facilitator helping students to construct solutions to problems Written by chemistry professors and research groups from a wide variety of colleges and universities the book offers a number of creative ways to make chemistry relevant to the student including Teaching science in the context of major life issues and STEM professions Relating chemistry to current events such as global warming pollution and terrorism Integrating science research into the undergraduate laboratory curriculum Enriching the learning experience for students with a variety of learning styles as well as accommodating the visually challenged students Using media hypermedia games and puzzles in the teaching of chemistry Both novice and experienced faculty alike will find valuable ideas ready to be applied and adapted to enhance the learning experience of all their students

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