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CHAPTER 2

ATOMS, MOLECULES, AND IONS

Problem Categories

Biological: 2.79, 2.80.

Conceptual: 2.31, 2.32, 2.33, 2.34, 2.61, 2.65, 2.71, 2.72, 2.81, 2.82, 2.93, 2.103, 2.113.

Descriptive: 2.24, 2.25, 2.26, 2.49, 2.50, 2.66, 2.70, 2.76, 2.84, 2.85, 2.86, 2.87, 2.88, 2.90, 2.91, 2.92, 2.94, 2.98, 2.101, 2.114.

Environmental: 2.122.

Organic: 2.47, 2.48, 2.69, 2.105, 2.107, 2.108, 2.115.

Difficulty Level

Easy: 2.7, 2.8, 2.13, 2.14, 2.15, 2.16, 2.23, 2.31, 2.32, 2.33, 2.43, 2.44, 2.45, 2.46, 2.47, 2.48, 2.62, 2.91, 2.92, 2.99, 2.100.

Medium: 2.17, 2.18, 2.24, 2.26, 2.34, 2.35, 2.36, 2.49, 2.50, 2.57, 2.58, 2.59, 2.60, 2.61, 2.63, 2.64, 2.65, 2.66, 2.67, 2.68, 2.69, 2.70, 2.71, 2.72, 2.73, 2.74, 2.75, 2.76, 2.79, 2.80, 2.81, 2.82, 2.83, 2.84, 2.85, 2.86, 2.88, 2.89, 2.90, 2.93, 2.94, 2.95, 2.96, 2.98, 2.101, 2.102, 2.103, 2.110, 2.112, 2.114, 2.115.

Difficult: 2.25, 2.77, 2.78, 2.87, 2.97, 2.104, 2.105, 2.106, 2.107, 2.108, 2.109, 2.111, 2.113.

First, convert 1 cm to picometers.

$$? \text{ He atoms} = (1 \times 10^{10} \cancel{\text{ pm}}) \times \frac{1 \text{ He atom}}{1 \times 10^2 \cancel{\text{ pm}}} = 1 \times 10^8 \text{ He atoms}$$

Note that you are given information to set up the unit factor relating meters and miles.

$$r_{\text{atom}} = 10^4 r_{\text{nucleus}} = 10^4 \times 2.0 \cancel{\text{ cm}} \times \frac{1 \cancel{\text{ m}}}{100 \cancel{\text{ cm}}} \times \frac{1 \text{ mi}}{1609 \cancel{\text{ m}}} = 0.12 \text{ mi}$$

For iron, the atomic number Z is 26. Therefore the mass number A is:

$$A = 26 + 28 = 54$$

Strategy: The 239 in Pu-239 is the mass number. The **mass number (A)** is the total number of

Chemistry Chang Solution Manual

**Raymond Chang, Brandon J.
Cruickshank**



Chemistry Chang Solution Manual:

Student Solutions Manual for Chemistry Kenneth Goldsby, Professor, Raymond Chang, Dr., 2018-02-01 *Student Solutions Manual for Chemistry* Kenneth Goldsby, Raymond Chang, 2012-01-19 The Student Solutions Manual is written by Brandon J Cruickshank Northern Arizona University Raymond Chang and Ken Goldsby This supplement contains detailed solutions and explanations for even numbered problems in the main text The manual also includes a detailed discussion of different types of problems and approaches to solving chemical problems and tutorial solutions for many of the end of chapter problems in the text along with strategies for solving them Note that solutions to the problems listed under Interpreting Modeling Estimating are not provided in the manual **Student Solutions Manual for Chang Chemistry With Advanced Topics** Raymond Chang, 2015-08-03 **Student Solutions Manual to accompany Chemistry** Raymond Chang, 2006-03-03 By Brandon J Cruickshank Northern Arizona University and Raymond Chang This supplement contains detailed solutions and explanations for all even numbered problems in the main text The manual also includes a detailed discussion of different types of problems and approaches to solving chemical problems and tutorial solutions for many of the end of chapter problems in the text along with strategies for solving them Student's Solutions Manual to accompany Chemistry Raymond Chang, 2009-01-07 Student Solution Manual to Accompany Chemistry Raymond Chang, 2004-01-08 The Student Solutions Manual will have all the solutions to the even numbered problems in the text The style of the solutions will match worked examples in the text to help the student learn how to solve the problems *Student Solutions Manual for Chang's Chemistry* Philip C. Keller, Jill L. Keller, Raymond Chang, 1988 *Student Solutions Manual for Chemistry 13e* CHANG, 2018-02 **Solutions Manual to Accompany General Chemistry** Raymond Chang, 1986 **Student Solutions Manual to Accompany Chang Chemistry** Jerry Mills, Raymond Chang, 1991 Designed for the two semester general chemistry course Chang's textbook has often been considered a student favorite This best selling textbook takes a traditional approach It features a straightforward clear writing style and proven problem solving strategies The strength of the seventh edition is the integration of many tools that are designed to inspire both students and instructors The textbook is the foundation for the technology The multi media package for the new edition stretches students beyond the confines of the traditional textbook Chemistry Raymond Chang, Brandon J. Cruickshank, 1997 **Problems and Solutions to Accompany Chang's Physical Chemistry for the Chemical and Biological Sciences** Helen O. Leung, Mark D. Marshall, 2000-08-11 This Solutions Manual to accompany Raymond Chang's Physical Chemistry for the Chemical and Biological Sciences restates each of the 1020 innovative chapter ending problems in the text followed by a detailed solution Each solution is approached with the same conversational style that the authors use in their own classrooms as they try to teach solutions to the problems rather than simply giving out answers One hundred forty three figures and diagrams are used to illustrate the solutions Both authors are recent recipients of the Henry Dreyfus Teacher Scholar award and bring to

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