

## ABSTRACT

### **Chatrine, IDN 4213131038 (2025). Analysis of Student Misconceptions Using Five-Tier Diagnostic Test on Reaction Rate Material.**

Correct conceptual understanding is the basis of learning chemistry, including reaction rates. This material is often considered challenging because of its abstract nature and its application, leading to misconceptions. This study explores these misconceptions and their causes in class XI students' IPA understanding at SMAN 5 Medan. The method used is descriptive quantitative approach, including purposive sampling, tests, and interviews. Data analysis techniques include validation analysis by expert validators, quantitative analysis, and misconception analysis. A small-scale trial validated test's validity, reliability, difficulty tier, discriminatory power and distractor. A larger-scale trial assessed students' misconceptions and identified sources from smaller trial. The feasibility of five-level diagnostic test instrument by considering expert validators obtained an average score of 20.5, indicating can used with minor modifications for effective implementation through 22 questions were valid and had high reliability (0.98217). The difficulty level was moderate and discriminating power was also quite good. The effectiveness of distractor answers was 80%. The overall misconception rate was low (9%). The misconceptions profile for each reaction rate sub-material as follows: concept of reaction rate (8%), collision theory (11%), factors affecting reaction rate (11%), determining reaction order, rate constant, graphs, and equations (9%), and reaction rate law-mechanism relationship (13%). Item 21 had highest misconceptions (20%), while items 1 and 22 had the lowest (3%). Based on the source, misconceptions from personal thinking (MC-PT) category had highest misconceptions (44%), while misconceptions by book (MC-B) category had lowest (11%). Further research is recommended to explore misconceptions in other materials.

**Keywords:** Misconceptions, Five-Tier Diagnostic Test, Reaction Rate.

