Implementing Multiplayer Virtual Reality For any Application in Three.js COMP 3490

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	(And everyone who made the libraries
	that this project depends on)
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1 Objective

Before starting this project, I was curious about the limits of mobile VR. I sought out to implement a very basic multiplayer VR environment as a proof of concept. This was achieved, and now you can watch an arcade machine with your friends, as you all move the claw up down and around in Virtual Reality.

2 Challenges in Implementation

a Implementing the stereoscopic view was very difficult at first, but after thoroughly studying the documentation of Three.js, I found a that you could add effect to the rendering of your scene, and one of those is 'Three.StereoEffect'. This works much more efficiently than making your own two cameras, and is much simpler to implement. The command is simply

```
effect = new THREE.StereoEffect( renderer );
effect.setSize( window.innerWidth, window.innerHeight );
```

3 Sample Calculation

Mass of magnesium metal	= 8.59 - 7.28
	= 1.31
Mass of magnesium oxide	= 9.46 - 7.28
	= 2.18
Mass of oxygen	= 2.18 - 1.31
	= 0.87

Because of this reaction, the required ratio is the atomic weight of magnesium: 16.00 of oxygen as experimental mass of Mg: experimental mass of oxygen or $\frac{x}{1.31} = \frac{16}{0.87}$ from which, $M_{Mg} = 16.00 \times \frac{1.31}{0.87} = 24.1 = 24$ (to two significant figures).

4 Results and Conclusions

The atomic weight of magnesium is concluded to be 24, as determined by the stoichiometry of its chemical combination with oxygen. This result is in agreement with the accepted value.

Figure 1: Figure caption.

5 Discussion of Experimental Uncertainty

The accepted value (periodic table) is 24.3 **?**. The percentage discrepancy between the accepted value and the result obtained here is 1.3%. Because only a single measurement was made, it is not possible to calculate an estimated standard deviation.

The most obvious source of experimental uncertainty is the limited precision of the balance. Other potential sources of experimental uncertainty are: the reaction might not be complete; if not enough time was allowed for total oxidation, less than complete oxidation of the magnesium might have, in part, reacted with nitrogen in the air (incorrect reaction); the magnesium oxide might have absorbed water from the air, and thus weigh "too much." Because the result obtained is close to the accepted value it is possible that some of these experimental uncertainties have fortuitously cancelled one another.

6 Answers to Definitions

a The *atomic weight of an element* is the relative weight of one of its atoms compared to C-12 with a weight of 12.0000000. . ., hydrogen with a weight

of 1.008, to oxygen with a weight of 16.00. Atomic weight is also the average weight of all the atoms of that element as they occur in nature.

b The *units of atomic weight* are two-fold, with an identical numerical value. They are g/mole of atoms (or just g/mol) or amu/atom.

c *Percentage discrepancy* between an accepted (literature) value and an experimental value is

$$\frac{\text{experimental result} - \text{accepted result}}{\text{accepted result}}$$