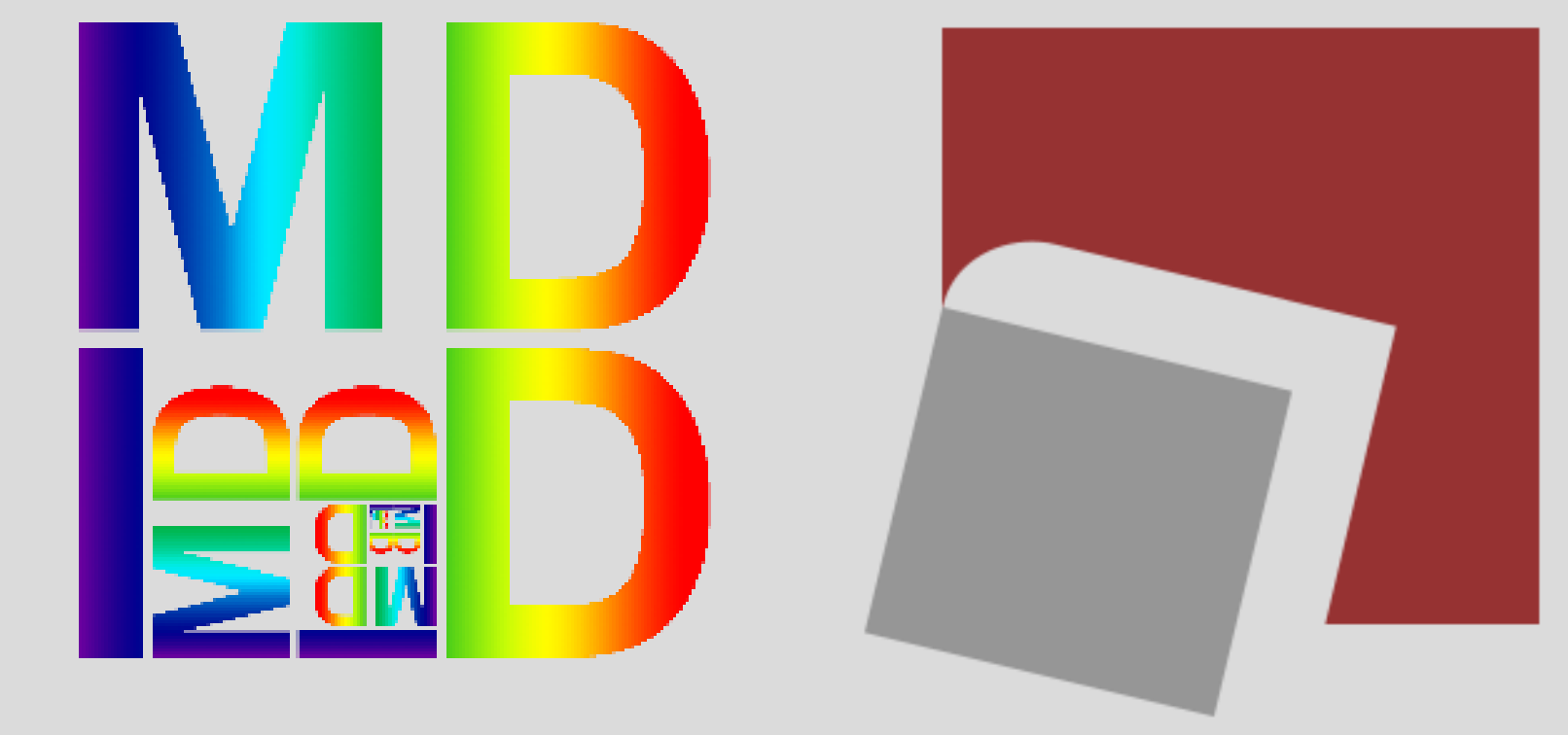


Investigating the Time Evolution of Color Distribution in a Variety of Surfaces

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Introduction

Investigation of color distribution in liquids, is one of the most important problems in fluid dynamics. an analytical description of such phenomena has been done . but with constant raise of industries, it seems we need to understand more aspects of such phenomena.

The purpose of this investigation is to show experimentally, that a small droplet of color is distributed in any fluid at a different rate, due to Brownian motions of color molecules in a fluid environment.

Method

The Experiment has been done in a petri - dish with a diameter of 5 cm and on the surface of a liquid layer with a depth of 4 mm. paint with a density of $1.02 \frac{gr}{cm^3}$ using a ($200 \mu.Liter$) micropipette, slowly dripped in the center of the liquid surface.

The fluids used as the substrates are as follows: Biocarbonate buffer, Cold water ($14.8^\circ C$), Propanol, Tetrahydrofuran and hot water($97^\circ C$).

Due to the slow process of increasing the color drop radius, the test is photographed at intervals of several minutes. And for image transparency, the petri-dish is placed on a white light LED Surface.

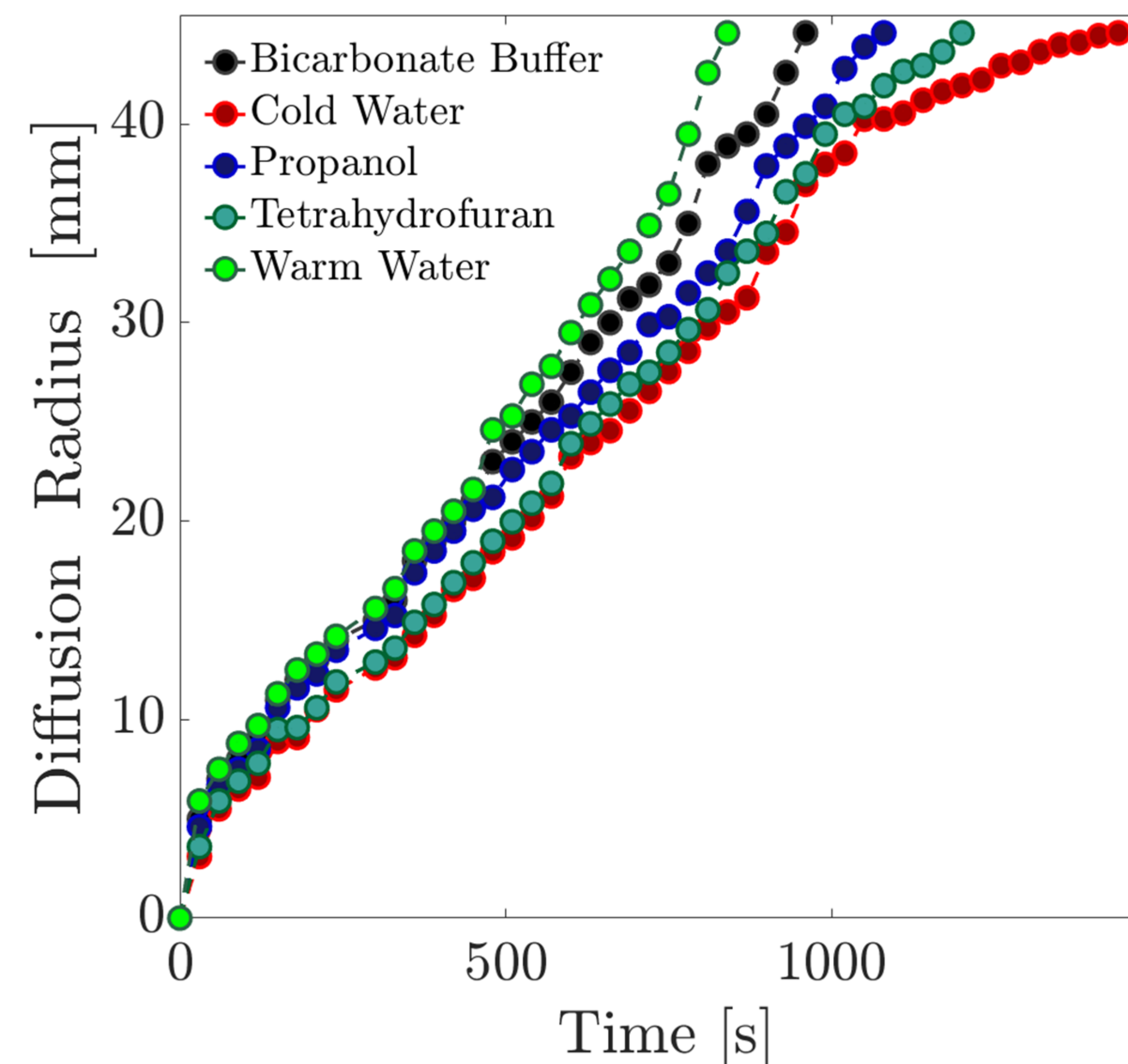


Figure 1

The radius of diffusion over time for five different surfaces.

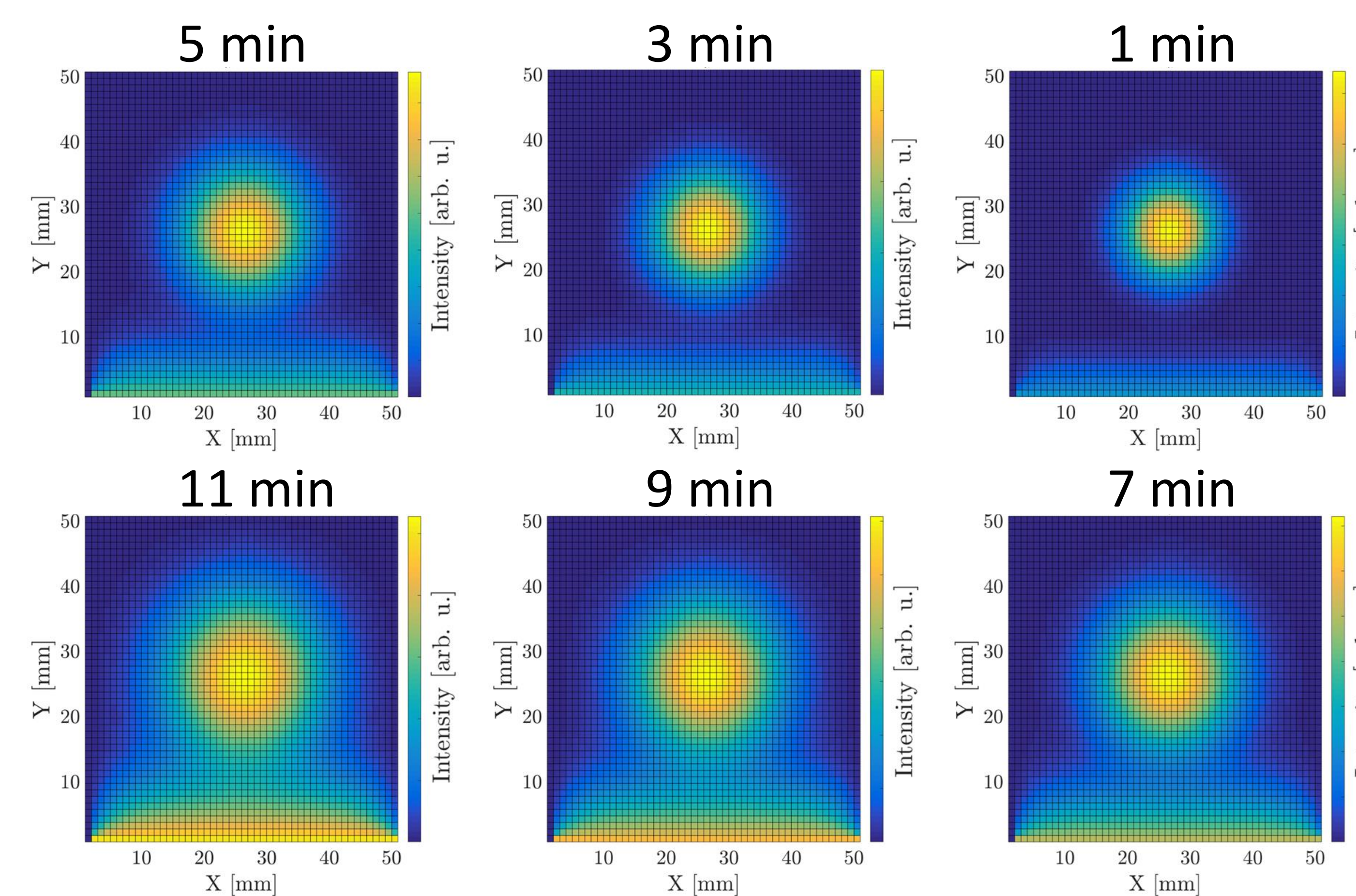


Figure 2

Simulations of ink diffusion on cold water surface using diffusion equation show radius changes for times one, three, five, seven, nine and eleven minutes after the start of diffusion.

Results

In this research, experimentally Temporal evolution of paint drops on a variety of surfaces with different molecular structures has been studied.

The results of our observations show that in the Early moments after distribution, the radius of the paint drop was small and increased with the spread of paint drops around the surface of the solution. Based on our observations, the process of spreading the paint on the surface slows down over time. and in some solutions, the distributing process may be very long.

Discussion

A better understanding of how the average color drop radius changes and the study of their behavior is one of the most attractive and valuable cases of fluid science. It seems that by repeating the experiment, at longer times, also by numerically solving the distribution equation for this situation and comparing it with the current data, we can gain a more accurate understanding of such phenomena.

References

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