

## **An Instagram user shares experimental data with people**

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**We met an Instagram user that shared paper chromatographic data with people widely and the user name is “PaperChromatographics”. The experimental data sharing seems to be a new style differently from that of a journal-based community. The Instagram community has an easily-searchable and renewable keyword mechanism and the keyword is tagged with a hash mark. Through the mechanism, a possibility of science-community transforming is brought by people’s meeting unexpectedly with different interests on the same paper chromatograms.**

### **Science Community and scientific data shared among people**

A person who has an interest in science can be a member of a traditional and journal-based community and the members communicate each other through some journals as writers and readers [1]. There the scientific data are peer-reviewed to keep their accuracy and precision and the community has contributed to science development. It’s common understanding that scientific data are of mankind property and should be shared among people. The journal-based community is expected to communicate with sectors outside of the community by some efforts as open lectures, experimental classes for young generation and so on. But the communication seems to be inactive and unsmooth because of the fixed and hard boundary of the community. On the other hands the fixedness and the hardness have made the community to have successful contributions to science development.

In a couple of decades social network services have started as Facebook, Twitter and Instagram and the meeting between experimentalists and those SNSs has induced different types of scientific-data sharing communities. In this article we report that an Instagram user has widely shared paper chromatographic data with people.

### **Paper chromatography to form patterns**

Paper chromatography is an analytical method by which a chemical mixture sample is separated into components as shown in Figure 1 and the components are identified with standard chemicals. A spot of a mixture is made close to an end of a rectangular paper tip and the end is put into water. By capillary action the water starts to move forward to the other end through the paper. In this process a mixture of the spot is solved in the

water and each solute (component) moves with the water movement. An apparent moving speed of a solute is affected by interaction between the solute and cellulose network of the paper and it results in that a moving distance of the solute in a given time is

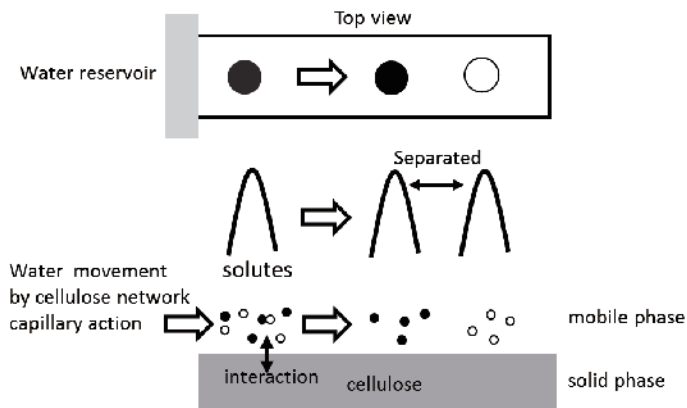


Figure 1 Principle of paper chromatography

specific and can be a factor to identify the solute. This is the principle of paper chromatography as an analytical method.

Figure 2 shows typical paper chromatograms. The left of Figure 2 is a chromatographic paper tip with a black ink spot (indicated with a) close to the end of the tip. The end of the tip is put into water to start water moving in the paper tip. The spot is separated into the components (indicated with b, c and d) as shown in the right of

Figure 2. The solutes are identified by comparing the patterns with those of standard chemical substances.

Paper chromatography can be used to form patterns as many persons see it in a high-school textbook of chemistry and kids enjoy it in an open class after school. We can find a pioneer of it in the literature. In 1850, a German chemical engineer, Friedlib Ferdinand Runge, used paper chromatography to form patterns and collected the pictures of the patterns in a book to be applied to pattern design in texture industry [2-4]. The collection book has been opened on the Internet [5].

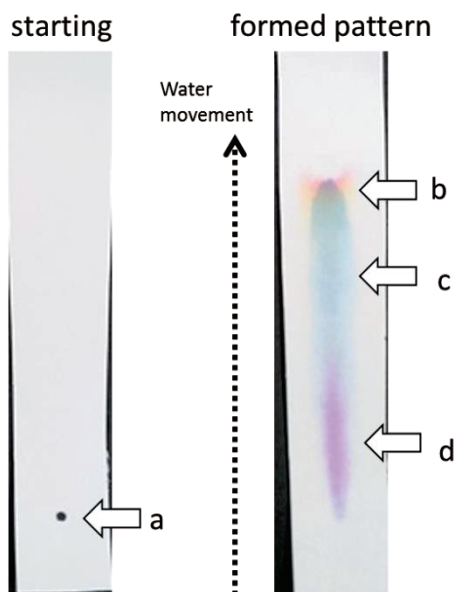
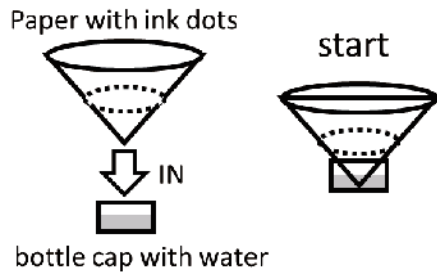


Figure 2 Typical paper chromatograms

### An Instagram user produces patterns by “paper chromatographics”

Recently, we met a certain person that shared paper chromatographic data with people widely on the Internet. The person took a large number of the pictures of the paper chromatographic patterns and uploaded them onto Instagram which was a photograph-based social network service. The person newly made a new word, “paper chromatographics”, and it meant a method to form patterns by chromatography. The person made an Instagram account with a name of “PaperChromatographpics” to join to the SNS for sharing the data with people and we call the person “PaperChmatographpics” as below in this article.

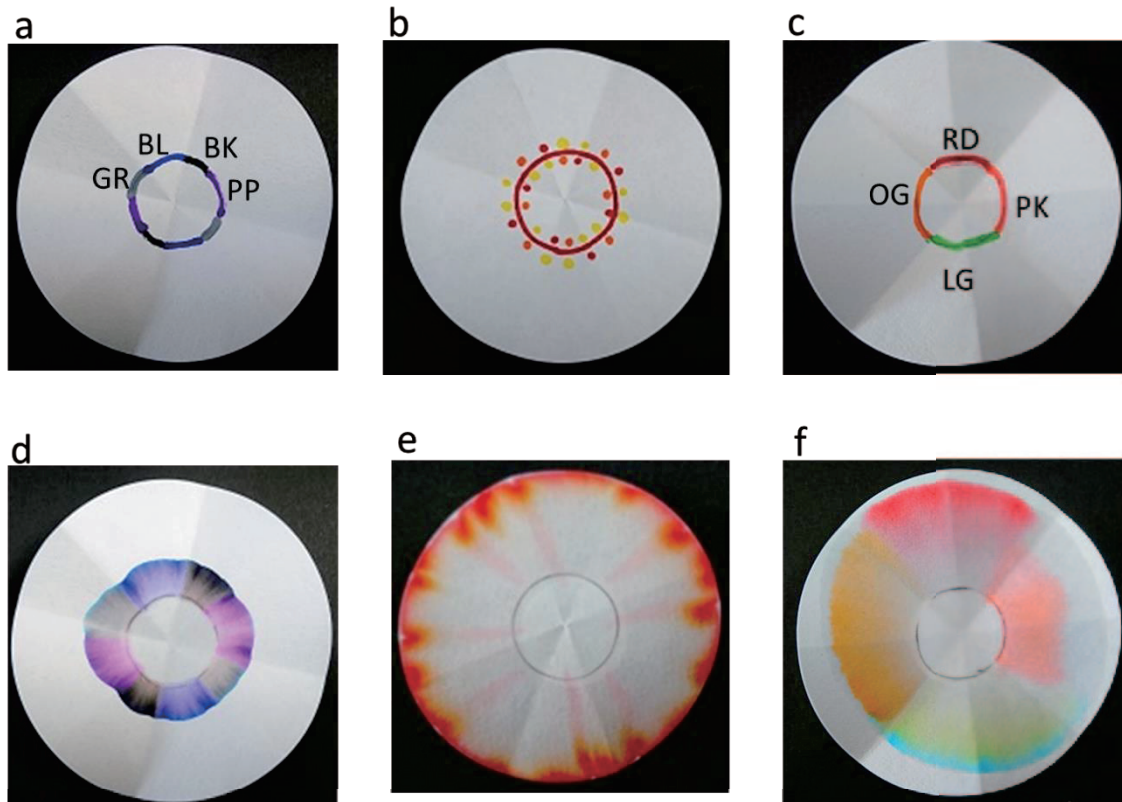
“PaperChromatographpics” employed the pattern



**Figure 3 Pattern formation by paper chromatography**

formation method as shown in Figure 3. A circle-shaped paper was folded and transformed to a cone. Dots were made along a circle on the paper by ink pens as indicated by dots in the left-sided illustration of Figure 3. In the right-sided illustration of Figure 3, the top of the cone was put into water in a bottle cap to start to form a pattern. Under these conditions water moved in a radial manner in the paper

and the formed patterns looked like opened flowers. The snapshots of the pattern formations are shown in Figure 4. The pattern formations depended on used pen inks, ink makings, forming time and water supply. A frequently-used color pen ink is made of some kinds of dyes and the dyes are separated on a paper as shown in Figure 2. Figure 4a was developed to Figure 4d where gray(GR), blue(BL), black(BK) and purple(PP) ink pens were used. Figure 4b was developed to Figure 4e where dots were distributed along a circle. Figure 4c was developed to Figure 4f where red(RD), orange(OG), pink(PK) and light green(LG) ink pens were used.



**Figure 4 Paper chromatographic patterns**

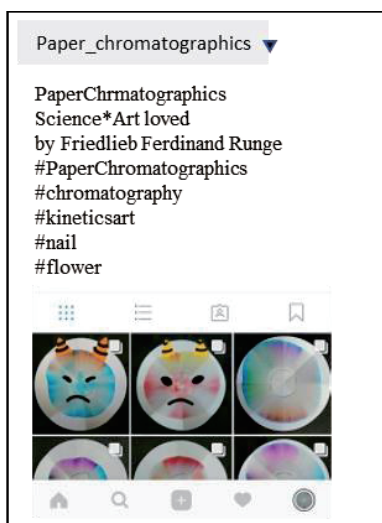


Figure 5 Top page of Instagram

### Further perspective of sharing experimental data with people on Instagram

Let us discuss about sharing experimental data with people. As we mentioned scientific data is of mankind property and the data sharing is expected to promote widely. We here consider attractiveness of sharing paper chromatographic data of pattern formations with people on Instagram. First, Instagram is a photograph-based SNS and is suitable for sharing foamed pattern photographs. Additionally, Instagram can accept a short text message to explain the formed patterns as captions of figures. Secondly, paper chromatography can be easily exerted with kitchen paper, daily-used low-cost ink pens and water by anybody. Thirdly, quality of taken photographs is high because of advanced image sensors as charge-coupled devices (CCDs)

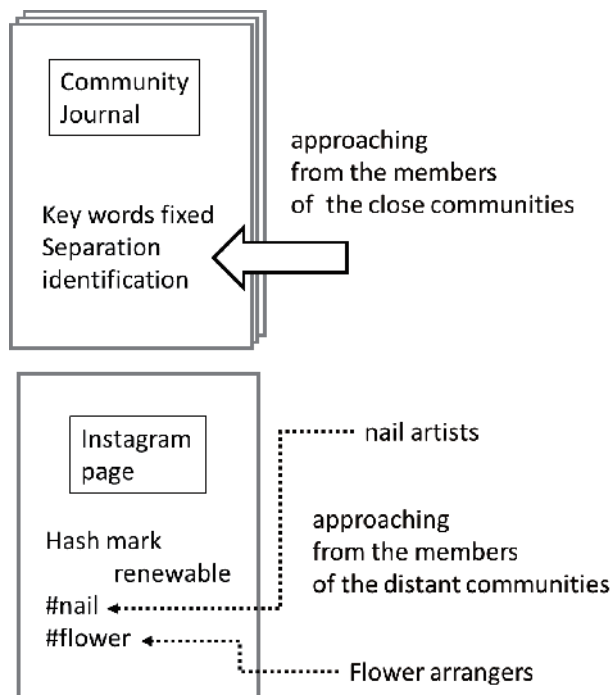


Figure 6 Approaching to community journal and Instagram page

and complementary metal-oxide-semiconductors (CMOSs), and image processors, so called “engines”, in smart phones to be used for taking photographs. The smart phones are small but fast computers now and data sharing and data analyzing can be carried out quickly. Fourthly, pattern formation by paper chromatography seems to be a simply understandable phenomenon but complicated actually. Because it’s theoretically explained with a reaction(adsorption-desorption)-diffusion-convection model and solving the model mathematically is a big research subject. Then taking photographs is equivalent to solving the mathematical models.

Finally, we discuss about effectiveness of data sharing on Instagram. Figure 5 shows the top page of “PaperChromatographics” and an Instagram page has keywords with hash marks, #. This is the

easily-searchable hash-tagged keyword mechanism in the Instagram community. The keywords also are renewable while the keywords are fixed in the community journal. Fixed keywords are carefully chosen to be attractive for the member of the close communities and then fixed keywords bring approaching from the members of the close communities. On the other hands, renewable keywords can be examined freely and then the renewable keywords can bring unexpected approaching to the Instagram page from the members of the

distant communities as shown in Figure 6. For example, #nail brought approaching from a nail artist or #flower brought approaching from a flower arranger onto the Instagram page of “PaperChromatographics”. This is a new type of data sharing as pointed out by discussion with another Instagram user WA-Meets-Jazz as follows [6]. There are paper chromatographic patterns and some persons see those. They have different interests on the same pattern. The interests are brought from distant communities. For example, a nail artist and a flower arranger have different interests on the same pattern. Meeting of the distant communities on an Instagram page brings a possibility to break the boundary or to create an unexpected development of the science community.

### Acknowledgement

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