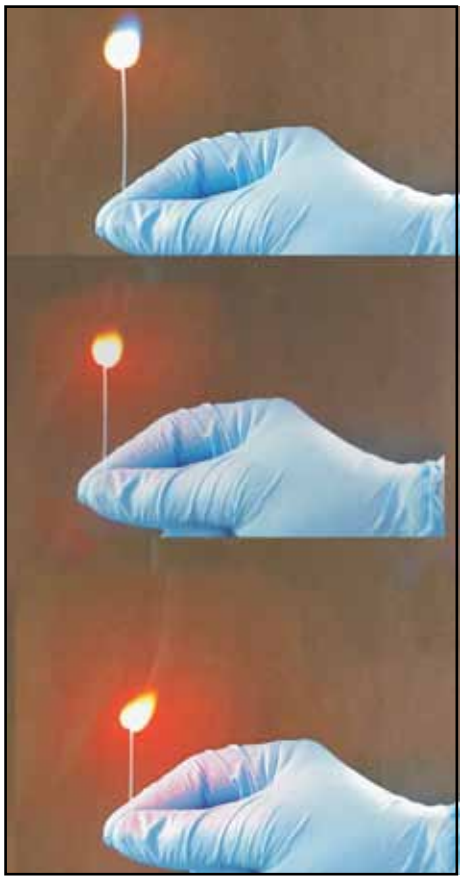
Look Mum No Electricity

Sending information using chemistry.

To many of us, the most memorable bits of school chemistry classes were lessons where we set fire to stuff over a Bunsen burner to produce different brightly coloured flames.

Now a group of chemists from Harvard University, who are famous for lateral thinking, have found a way of using these colourful flames to transmit coded information.



Chemists have developed the 'infofuse'.

They dab solutions of alkali metal salts onto a strip of nitrocellulose, gun cotton, in defined patterns to make 'infofuses'.

When these fuses burn, the dots of metal produce coloured flames. creating coded pulses of light that can be used to send messages.

The visual equivalent of Morse code, maybe.

For their test run they sent the message, "LOOK MOM NO ELECTRICITY". These Yanks can't even spell mum!

Very basic in this digital computer age, but it's in its infancy which could lead to a lightweight, self-powered form of communication that doesn't involve any electronics to store or transmit information.

The scientists involved call their idea, 'infochemistry'.

The research is geared towards information through chemistry, cells communicating using chemical signals.

And from there towards bridging the gap between that sort of chemical communication and the digital communication that our technological infrastructure is built on.

Think of DNA as the biological version of this concept.

Through a chain of molecules, it encodes instructions for building proteins that is then transmitted in the form of RNA and translated by enzymes. And outside this realm of biology, similar systems don't exist.

But think of signal flares, smoke signals or even litmus tests as ways of transmitting information through chemistry.

Simple and slow ones agreed but building blocks towards a speedier system

And infofuse is one such, more sophisticated, system.

Infofuse is made of a highly flammable material called nitrocellulose or 'flash paper'.

Codes are impressed on the paper using small spots of metal ions dotted along the fuse strip using either a small pipette or an inkjet printer.

As the strip burns, the different physical appearance of the flame, allows the code to be read.

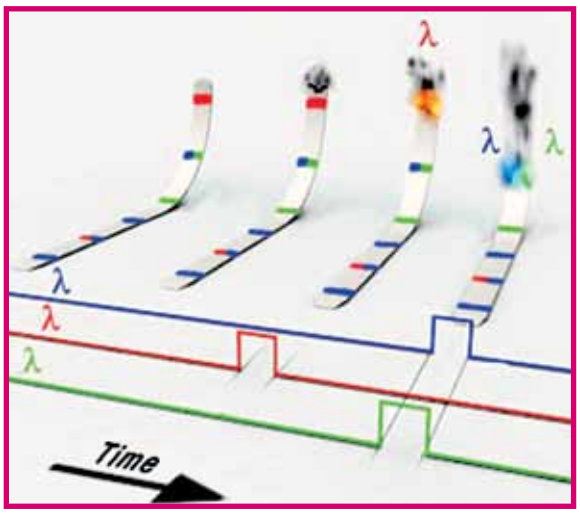
The wavelengths and order of the flames carry the messages.

It burns with a 1,000C flame that moves along the paper at a constant speed, producing very little smoke and leaving no ash.

In the pilot test, scientists used the salts of just three metals, lithium, rubidium and caesium. The code was developed so that every letter, every digit and four basic symbols were each represented by a unique combination of two consecutive pulses of light.

In every pulse, each of the three emitters was either ablaze or not producing eight possible combinations of light.

To ensure that the code is as unambiguous as possible, the combinations that were easiest to resolve were assigned to the most common letters, E, T and A.



The combinations that could be most easily confused with one another were assigned to Q, Z and X.

In the test-run, the pulse frequency was 11Hz and the entire message took less than four seconds to transmit.

Yes there is an inaccuracy factor because the flame is moving and small variations in the nitrocellulose strip can change the rate at which it burns and the intensities of the flames.

But errors were simple to pick up and correct post dispatch.

The infofuse or similar could be used in situations where electricity is of limited availability or not available, or when carrying large quantities of batteries is difficult.

Emergency signal flares are one such use which do not have to transmit much information.

The messages are received by a special camera or a fibre optic cable linked to a spectrometer, a device that measures the intensities of different wavelengths of light.

The technology is only in its infancy and there are many potential ways it could be developed.

Perhaps an example would be if you created a chemical "typewriter" that could encode the strips without using electricity.

As long as you had the chemicals necessary, you'd have the ability to transmit information, even if no power sources of any kind were available.

A coded flare could get someone's attention and when you know they are looking you could burn a coded strip with more information.

I understand there is a copyright battle taking place at the courthouse in Little Big Horn, where Chief Sitting Bull is suggesting that he discovered this system, in which he used a few twigs, a boy scout and a patterned blanket.

Sitting Bull is calling "Baldie" General Custer as a witness. Readers may rememebr General Custer from his army exploits when he was known as "Yellow Hair" until an involuntary haircut by Sitting Bulls coiffure specialists!

When Ken Livingstone was leader of the GLC, he sent two guys out with a van and grass cutters to clear up any fields that looked in need of a little TLC.

They came across two fields that were very overgrown and needed a tidy, so they decide to take a field each.

The first guy goes into his field and starts the cutter up and ploughs straight through, cutting everything in his path.

In the middle of the field was a patch of thousands of beautiful Buttercups, no matter, wham they've gone.

Well, finally Mother Nature got mad.

She came up from the ground and said to the man, "I've created this beautiful field of Buttercups and you have no respect for them at all, now they are ruined. I'm going to have to punish you. Since these are Buttercups, your punishment is that you cannot have butter for a year."

The man started to laugh and went back to whacking at the Buttercups.

Mother Nature said, "Hey, this is no laughing matter. What do you find so funny?"

The man looked up and said, "My buddy is over on the other side in the Pussywillows."

A biker stops by the Harley Shop to have his bike fixed.

They couldn't do it while he waited, so he said he didn't live far and would just walk home.

On the way home he stopped at the hardware store and bought a bucket and an anvil.

He stopped by the feed store and picked up a couple of chickens and a goose.

However, he now had a problem: how to carry all of his purchases home.

The owner said, "Why don't you put the anvil in the bucket, carry the bucket in one hand, put a chicken under each arm and carry the goose in your other hand?"

"Hey, thanks!" the biker said, and out the door he went.

But in the parking lot he was approached by a little old lady who told him she was lost. She asked, "Can you tell me how to get to 1603 Mockingbird Lane?"

The biker said, "Well, as a matter of fact, I live at 1616 Mockingbird Lane. Let's take my short cut and go down this alley. We'll be there in no time."

The little old lady looked him over cautiously, then said, "I am a lonely widow without a husband to defend me.

"How do I know that when we get in the alley you won't hold me against the wall, pull up my skirt, and ravish me?"

The biker said, "Holy smokes lady! I am carrying a bucket, an anvil, two chickens, and a goose.

"How in the world could I possibly hold you up against the wall and do that?"

The lady said, "Set the goose down, cover him with the bucket, put the anvil on top of the bucket, and I'll hold the chickens."

A forty-something went to a plastic surgeon for a facelift.

The doctor told her about a new procedure called "The Knob," where a small knob is placed on top of a woman's head that can be turned to tighten up her skin to produce the effect of a new facelift.

The woman thought that sounded like a great idea decided to get "The Knob".

Over the course of the next several years the woman tightened the knob whenever she felt she needed a facelift.

The effects were wonderful and the woman remained young looking and vibrant.

However, after fifteen years and countless knob turnings had passed, the woman returned to the surgeon with two problems:

The woman explained to the surgeon, "All these years, everything has been working fine. I've had to turn the knob many times and I've always loved the results. But now I've developed two annoying problems. First, I have these terrible bags under my eyes and the knob won't get rid of them."

The doctor examined her closely and said, "Those aren't bags, those are your breasts."

She said, "Oh, I see. I guess there's no point in asking about the goatee then."