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Looking at Plasma through Fodel Eyes

By Ken Werner

January 31, 2008 – DuPont Microcircuit Materials looks at plasma display panels (PDPs) from its position as the maker of Fodel photo-imageable thick-film conducting pastes – a critical manufacturing material for PDPs.

Ken Werner
Sr. Analyst & Editor

Fodel paste is used to fabricate the bus lines in a PDP, and the material requirements are demanding. The material must be conductive, black in color (to minimize reflections that degrade contrast ratio), capable of being applied with thick-film techniques, and it must be photo-imageable – that is, it must be possible to define the lines by selectively exposing the material to light. And, in this era of 1080p plasma television sets, the photo-imaging must be able to produce very well-defined bus lines with feature sizes smaller than ever before.

DuPont has been able to do this, but only by including the relatively rare metal Ruthenium – until now. The price of Ruthenium has been increasing rapidly over the last couple of years, in part because it's used in the new generation of disk drives that use perpendicular magnetic recording, which has created an expectation of future shortages. About a year ago, DuPont announced the seventh generation Fodel, which reduced the Ruthenium content by 80% and reduced the cost to panel makers by 25%.

Recently, DuPont announced its 8G Fodel paste, which does away with Ruthenium entirely. And earlier this week, the company announced that Matsushita would be using 8G Fodel in all of its Panasonic Viera PDP-TVs.

I know we're looking at details of panel fabrication that may look rather narrow to many readers, so let's ask straight out, how significant is this in the overall scheme of things? Answer: More than I would have expected.

According to Marc Doyle, Asia Pacific Regional Director for DuPont Microcircuit Materials, there are approximately 1,000-1,200 tons of paste in the total paste market. This estimate includes both silver and black paste, and paste for address lines (which is on the other side of the panel from the bus lines, and which use only silver) as well as bus lines. If the average selling price of paste is approximately 40 cents per gram, then the total "paste" market is approximately US $400-500M USD. Doyle estimates the paste market grows at the same rate as the total PDP market – approximately 20-25% annually. (The industry estimates PDP sales as going from about 12M units last year to about 15M in 2008.)

Taking this down to the panel level, a 42-inch PDP uses about 50 grams of paste for the bus lines and roughly 35 grams for the address lines. A 50-inch panel would use another 15-20 grams of paste.

With 8G Fodel paste, the cost of the black paste is being reduced by 50%, and the black paste accounts for about half the paste used in the bus lines, so the cost of the total bus-electrode

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metallization is decreased by about 25%. That's about $5 for each 42-inch panel, says Doyle, on a panel whose total cost is about $300. That's close to 2% of total panel cost, and in a business not known for high margins, that's significant.

How much of the PDP market uses Fodel? All major Matsushita lines use it, and all new Panasonic models will be switching over th 8G Fodel. Matsushita has roughly 35% of the total PDP market. In addition, says Doyle, "We supply Fodel thick-film electrode paste to most PDP makers who use thick-film metallization." Another datum is that only FHP uses thin-film instead of thick-film metallization for PDP electrodes, and FHP's share was somewhere around 14% in 2007.

So, although DuPont doesn't break out earnings from Fodel, it's clear that Fodel paste is used in more than 35% of the PDPs made in the world and perhaps in as many as 85% of the PDPs made. Some readers, knowing what their own companies do, will be able to zero in on a more specific number.

Whatever that specific number is, it's clear that 8G Fodel paste will save the PDP industry a significant amount of money. But that raises a question. Why would DuPont want to replace a dominant product with a less expensive one? Says Doyle, "We want the PDP industry to continue its growth, and for that to happen it must remain cost-competitive with LCD."

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