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TITLE (AND CASE NUMBER) OF INVENTION

COPPER-CONTAINING COMPLEXES FOR USE AS PVC SMOKE SUPPRESSANTS AND FIRE RETARDANTS (0506)

INVENTORS

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APPLICATIONS

This invention describes an inexpensive and effective fire and smoke inhibitor for PVC formulations.

SUMMARY

For commercial polymers, the problems of flame and smoke are of tremendous importance. In particular, poly(vinyl chloride) (PVC) is a high-volume plastic that is inherently nonflammable and yet gives rise to both smoke and flame during fires.

Dr. Starnes and Dr. Pike have identified several copper additives that are highly effective as combustion inhibitors for PVC. Mixed-metal oxides of copper(II) are especially attractive in this regard, and some of them are synergistic as combustion inhibitors when they are combined. In particular, combinations of $Cu_3(MoO_4)_2(OH)_2$ and $CuTi_3O_7$ demonstrate tremendous efficacy as combustion inhibitors, surpassing the efficacy of either mixed metal oxide when used alone, and also demonstrating superiority relative to combustion inhibitors that are used commercially. The low cost of $CuTi_3O_7$ gives this combination particular commercial appeal. These combinations are particularly useful for PVC applications wherein color is of low importance.

ID#	Combustion Inhibitor (5 phr total)	Initial mass (g)	TTI (s)	THR (MJ/ m^2)	TSR (-)	HRR (kW/m^2)	EHC (MJ/kg)	MLR (g/s)	SEA (m^2/kg)
2A	100% Climax AOM A20171	52.3	533	14.3	1213	39.4	20.5	0.017	196
		51.7	452	14.4	1223	40.2	20.2	0.018	280
2H	50% CuMo 50% CuTi	55.7	>1200	15.4	832	11.9	3.1	0.034	167
		55.0	>1200	22.8	912	19.8	4.8	0.035	192

PATENT STATUS

Issued U.S. Patent No. 7,718,725

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