

**STANDARD OPERATING PROCEDURE:  
STAINING SDS-POLYACRYLAMIDE GELS (PAG) WITH SILVER SALTS<sup>1</sup>**

PI: _____	Room & Building: _____
Department: _____	Research Group: _____
Date: _____	Pertains to Lab Protocol: _____

**PROCEDURE**

Attach the experimental protocol for staining SDS-polyacrylamide gels with silver salts.

**MATERIALS & HAZARDS**

Principal Materials Used	Corrosive	Irritant	Sensitizer	Reproductive toxin	Acutely Toxic	Carcinogen	Flammable	Combustible	Neurotoxin	Oxidizer	Other Comments:
Silver nitrate	X	X			X						See comment 1, below.
Ethanol		X					X				See comment 2, below.
Acetic acid, 1%	X	X									
Sodium carbonate	X	X									
Formaldehyde	X	X		X	X	X		X			See comment 3, below.
Sodium dodecyl sulfate (0.1%, 10%)		X									See comment 4, below.
Sodium thiosulfate		X									
N,N'-methylenebisacrylamide		X							X		See comment 5, below.
Acrylamide (monomer)		X		X	X	X	X		X		See comment 6, below
TEMED (N,N,N',N'-tetramethylethylenediamine)	X							X			
Tris base		X									
Ammonium persulfate	X	X								X	

**Other comments:**

1. In contrast to ammoniacal silver salts, silver nitrate solutions are easier to prepare and do not generate potentially explosive by-products.
2. Inhaling high concentrations of vapor may cause irritation of the eyes and respiratory tract. May cause effects on the central nervous system.
3. May cause sensitization. Formaldehyde is toxic through skin contact and inhalation of vapors. All operations involving formaldehyde should be carried out in a chemical fume hood. Additional safety precautions pertaining to formaldehyde can be found in the SOP addressing formaldehyde.

4. Sodium dodecyl sulfate is a nuisance dust, but may also cause sensitization if inhaled. Wear a mask when weighing SDS and wipe down the weighing area and balance after use because the fine crystals of SDS disperse easily. There is no need to sterilize 10% SDS.
5. Bisacrylamide is a potent neurotoxin and is absorbed through the skin. The effects are cumulative. Wear gloves, eye protection, and a mask when weighing powdered N,N'-methylenebisacrylamide.
6. Acrylamide is a potent neurotoxin and is absorbed through the skin. The effects of acrylamide are cumulative. Wear gloves, eye protection, and a mask when weighing powdered acrylamide. Although polyacrylamide is considered nontoxic, it should be handled with care because of the possibility that it might contain small quantities of unpolymerized acrylamide (e.g. wear gloves, eye protection, and a mask when washing the pipette and the syringe). Periodically treat area where unpolymerized acrylamide is used with 1.6% potassium persulfate, then with 1.6% sodium metabisulfite. Let stand for 30 minutes, and then wash with plenty of water.

### ENGINEERING/VENTILATION CONTROLS

All procedures involving the use of acrylamide, methylenebisacrylamide, and ammonium persulfate should be performed in a chemical fume hood. **No open bench work!**

### RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT

The level of skin and eye protection should be selected based on the potential for splashing and other forms of exposure.

*Minimum potential for splash & exposure:*

- ✓ Chemical splash goggles
- ✓ Single pair of nitrile or neoprene gloves
  - Immediately replace with new gloves when splash occurs.
- ✓ Protective clothing (e.g. impervious lab coat, sleeves, closed-toed footwear)

*When using or transferring large quantities or when handling gels:*

- ✓ Chemical splash goggles
- ✓ Face shield (if not working in a fume hood or if hood's sash is not in the down position)
- ✓ Double glove with nitrile or neoprene gloves
  - Double-gloving is recommended, given the diversity of chemical hazards and highly corrosive chemicals involved.
  - Immediately replace with new gloves when splash occurs.
- ✓ Chemical-resistant, impervious apron/smock/lab coat (PE or PVC) that ties in the back
  - Avoid using the traditional cotton-polyester white lab coat, which readily collects/absorbs compounds.
- ✓ Protective clothing (e.g. sleeves, impervious boots or PVC disposable shoe coverings, closed-toed footwear)

## MATERIAL SAFETY DATA SHEETS

MSDSs are available electronically via EHS Department's Web page:

<http://www.uos.harvard.edu/ehs/msds/>. An option, but consider collecting in a binder the MSDSs that arrive with each order.

## WASTE DISPOSAL

Refer to the *Laboratory Waste Guide* posted at

<http://www.uos.harvard.edu/ehs/longwood/HarvardLongwoodLabWasteGuide.pdf>

## EMEGENCY PROCEDURES

Refer to the emergency flip chart titled "*EHS Procedures and Response Guidelines*," posted in each laboratory and found on EHS's webpage at <http://www.uos.harvard.edu/ehs/longwood>

- **Fire:** In the event of fire, evacuate and bar further entry. Do not use dry chemical, carbon dioxide or halon as extinguishing media.

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### References:

- <sup>1</sup> Sambrook, J., Fritsch, E., Maniatis, T., "Staining SDS-Polyacrylamide Gels with Silver Salts", *Molecular Cloning: A Laboratory Manual*, 2<sup>nd</sup> edition, Cold Spring Harbor Laboratory Press, 1989, p. 18.56-57.